PRE-INDUSTRIAL TRADE ON THE RIVER SEVERN
A COMPUTER-AIDED STUDY OF THE GLOUCESTER PORT BOOKS
c1640 - c1770

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ABSTRACT

Pre-industrial trade on the River Severn:

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This thesis addresses aspects of internal trade in pre-industrial England and Wales in order to shed new light on its volume, patterns, contents, conduct and development, and to develop new methods for its study. It focuses on the evaluation, computerisation, and analysis of coastal Port Books for Gloucester to undertake a case study of trade on the River Severn, one of the most important navigations in Europe.

The Introduction establishes the place of internal trade in the pre-industrial economy and argues that quantitative evidence about its detailed character is crucial to further exploration of a wide range of themes. Quantitative studies of coasting trade have been limited by difficulties in utilising Port Books, and have not been undertaken for inland transport. Chapter 1 assesses previous uses of Port Books and provides a detailed evaluation of the coastal Port Books for Gloucester in order to establish a sound basis for their interpretation. Chapter 2 sets out new methods devised for the comprehensive computerisation of Port Books and analytical techniques for utilising the data they contain. The remaining chapters employ the database to provide new data and interpretations concerning the volume, goods and patterns of trade on the Severn and their changes over time. Chapter 3 is concerned with the geographical patterns of trade and Chapter 4 with the range and character of the goods carried through Gloucester. Chapter 5 and Chapter 6 are detailed case studies of two of the most important commodities in the Severn trade, salt and tobacco. These indicate the potential for new understanding of the complexities of internal trade and the development of specific trades and industries. The Conclusion addresses the trade of the Severn and the role of river navigation, the character and development of internal trade in the pre-industrial economy, and the implications for future study of the methods developed.

CONTENTS

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INTRODUCTION

Between the world of production and the world of consumption, according to Fernand Braudel, 'slides another, as narrow and turbulent as a river': the world of exchange and trade[1]. The purpose of this study is to explore some of the characteristics of that world, which was so vital in permitting the co-ordination of producers with consumers and which, inevitably, was a reflection of their activities. Braudel's simile is here a reality, the focus of the thesis being a case study of the Severn: not only a 'turbulent river', but before the industrial revolution one of the most important arteries of trade in England.

By utilising new methods to study extensive but previously little-used evidence for the trade of the Severn between c1640 and c1770, a contribution will be made to knowledge of English inland trade in a crucial part of the period after the end of the middle ages and before the onset of rapid industrialisation. Few detailed investigations have been made of the kinds and quantities of goods carried, the geographical patterns of their carriage, or the changes in the nature of internal trade which occurred from season to season, year to year, or century to century. Yet this study shows that extensive evidence exists of such matters, in the form of the coastal Port Books, and that it can be utilised through the application of information technology. The study shows the kinds and qualities of evidence that can be derived from this source, and some of the applications to which it can be put.

As might be expected of a subject which for Braudel constitutes a whole world, and for others provides, in the form of 'the market', a complete political philosophy, the implications of new evidence spread wide. Although the aim of this thesis is to study trade itself, many themes are touched upon and many questions raised.

i. The pre-industrial period

The history of the period between the middle ages and the industrial revolution, within part of which this study is located, was one of important change in all aspects of life. It was a time of renaissance and enlightenment, of contact and colonisation in the New World, of new developments in agriculture and industry, of religious reformation, and of political disturbance.

For historians of the economy, the period is one of gradual but crucial change, establishing the basis for the massive economic, technical and social changes that were

to occur from the late eighteenth century onwards. The earliest historians of the industrial revolution, such as Toynbee and Beard, envisaged a sudden discontinuity in economic and social development in the late eighteenth and nineteenth centuries, suggesting that after a quiet, primeval England of the Middle Ages, 'suddenly, almost like a thunderbolt from a clear sky, were ushered in the storm and stress of the industrial revolution'[2]. However writers such as Mantoux, Gras and Nef, and later Ashton, emphasised the importance of change before the industrial revolution proper[3], making it clear that there was no simple elision between it and the middle ages.

Study of the sixteenth to eighteenth centuries has demonstrated the magnitude of changes in population, production, commerce, and society[4] in those centuries, forming what Clapham referred to as 'the commercialising of English life', and Wilson has called 'England's apprenticeship'[5]. Continuing research has suggested that the ground was cleared and new foundations were laid for a larger and more diverse economy[6]. Mendel and others have emphasised explicitly the importance of this period in creating the pre-requisites of the industrial revolution[7]. Steady re-structuring, the creation of new products and new markets, the development of skills, an increasing population, technological development and improving communications all contributed to the later spiral of advance[8]. These are essential themes in the long-term economic development of England.

At the end of the middle ages, England was a country of great regional and local variations, in which local markets dominated trade. Towns were mainly small and served constricted hinterlands with locally-produced crafts. Only a few centres were of importance in national or international trade, and the goods traded over great distances were few. Life was dominated by agriculture, creating strong seasonality in work and trade, and by marked fluctuations in general prosperity from year to year[9]. However, by the beginning of the industrial revolution, England had an economy more capable of ameliorating fluctuations in prosperity from year to year and less dependent upon the seasons. Patterns of trade had changed radically. Specialisation of production was much greater, with many regions producing goods traded over long distances. The complexity of commerce had greatly increased, expanding opportunities for economic contacts both between one part of the country and another and with a world much larger than had previously been perceived. The pace of the economy had quickened considerably. By the 1740s industrial expansion in nearly all sectors was being sustained, and it was accelerating rapidly by the 1780s[10]. In certain regions, output had grown to high levels and created local economies heavily based on manufacture and trade[11]. Population was increasing rapidly, especially in districts of dual occupation and industrial growth[12]. The more thriving towns were expanding

fast[13], agriculture was becoming more productive[14] and diverse[15], and the volume of trade was increasing[16].

It is dangerous to suggest dates for the completion of this intermediate phase of pre industrial modernisation. The industrial revolution was too complex a phenomenon to be encompassed within a simple model[17], and the evidence with which it has been dated has been called into question: quantification of industrial production is regarded as suspect because of its reliance on statistics of overseas trade[18], and other evidence based on technical innovation or changes in lifestyle, inevitably has been criticised on the grounds of subjective selection[19] or evaluation[20]. Some historians have abandoned the concept of an industrial revolution altogether[21], and over-confident models of datable economic take-off such as Rostow's[22] have become unfashionable[23]. With such a blurring of chronological boundaries and an awareness of the need to enquire into the dynamics of industrialisation, the importance of research into economic change in the sixteenth to eighteenth centuries is now fully recognised[24].

The term 'pre-industrial' has increasingly been used to refer to the notion of a period in the economic history of England which shaded out of the later middle ages and into the industrial revolution[25]. The term is parallelled in political and social history by the term 'early modern'[26] and in archaeology by 'post-medieval'[27], both of which identify an important, if inexact and dynamic, period. This is the way in which the term is used here, not in the sense popular among some European historians of a much longer period[28]. Within economic history 'proto-industrial' has emerged as an alternative term, which correctly acknowledges that industry existed and was developing, but this is best restricted to discussion of the Mendelian theory of rural industrial advance from which the term derives[29].

It would be wrong, however, to suggest that the pre-industrial period was a homogeneous one, as the last hundred years or so exhibited important differences from the sixteenth and early seventeenth centuries. Many historians have made this observation, but it is significant that two of the most eminent, who differ wholeheartedly on whether there was a political revolution in the middle years of the seventeenth century, are of the same mind on the timing of an upsurge in economic change[30]. Charles Wilson saw English economic and social history in the seventeenth and early to mid eighteenth centuries dividing into a time of 'painful economic readjustment' up to the 1650s, characterised by uncertain and depressed economic conditions in the aftermath of the sixteenth-century price inflation, and culminating in the upheavals of the Civil War; then a 'fertile and progressive' period of economic expansion and commercial development during the second half of the seventeenth century; and finally a phase of 'marking time' and relative stagnation before

accelerating growth began in the 1740s to 1760s[31]. Christopher Hill also promoted the idea of an economic discontinuity around the mid seventeenth century. Whilst rightly asserting that change did not occur overnight, he stated teasingly, 'In trade, colonial and foreign policy, the end of the Middle Ages in England came in 1650-51'; 'The Middle Ages in industry and internal trade also ended in 1641'; and 'In finance the Middle Ages in England ended in 1643'[32].

This study covers the latter part of the pre-industrial period, beginning around the middle of the seventeenth century. These years have been recognised as a coherent period of change in the English economy. Whilst they had much in common with the sixteenth and early seventeenth centuries, their differences from the pre-industrial period as a whole must also be recognised.

ii. Variables in the trading economy

Although this thesis is concerned with internal trade on the River Severn, the centrality of trade in the economy necessitates a sketch of economic factors in the period which affected, and were reflected by, trading patterns. This will provide a context of the latter half of the pre-industrial period within which evidence from the Severn can be set.

Population has been widely recognised as the most vital of vital statistics in an economy. A growing or declining population had important influences on production and consumption, and thereby trade. The Cambridge Group for the History of Population and Social Structure[33] has established authoritative estimates of English demographic change by aggregating findings from communities which have long series of parish registers. This has indicated that the population of England grew rapidly from the mid sixteenth to mid seventeenth centuries, probably doubling to a peak of about 5.3 million in 1657. There followed a period of stagnation until the mid-eighteenth century, characterised by swings of decline and growth, with a trough of 4.9 million in the mid 1680s, recovery to 5.35 million in 1721, then another period of slight decline from 1726 to 1731. Thereafter, accelerating increase regained the growth rates of the early seventeenth century by about 1771. At this time the population stood at nearly 6.5 million.

Changes in population have been linked strongly to economic influences, in that the most dynamic demographic factor seems to have been the birth rate, which responded to the economic well-being of the population[34]. This resulted in considerable geographical variation. In particular, growth was centred in thriving regions of domestic industry, especially the north west and the west midlands[35], and in

developing urban centres, which also expanded by migration from rural regions. Changes in the distribution of the population created shifts in internal trade as much as did the growth of the population as a whole, notably in supplying London and the most successful towns, but also in bringing a variety of goods to other prosperous regions. Emigration is now regarded as the chief force for population decline, although epidemics and food shortages, which affected trade more directly, were also significant factors. National fluctuations had many implications for trade. Growing numbers meant a greater need for basic supplies. A stagnant population might cause economic stagnation or, alternatively, improving incomes and increasing trade in consumer goods[36].

In the seventeenth and eighteenth centuries, it has been said, 'England's cities and towns were in the throes of transformation'[37]. The proportion of the population living in towns increased from about 20-23% in 1650 to about 33% by 1800. However this increase masked enormous variations. The importance of certain towns as commercial and industrial centres led them to grow faster, whilst some declined in absolute or relative terms. London and the great provincial centres all grew rapidly during the period. The capital increased in population from about 400,000 (7% of the population of England) in 1650 to 675,000 (11%) a century later, developing extraordinary importance as a centre of consumption, marketing and commercial organisation as well as government and society[38]. The leading provincial cities also grew substantially. Far the largest urban centres after London in 1600 were Norwich, York, Bristol, Newcastle and Exeter, and all of these continued to expand. However by the end of the next century all except Bristol had lost their place in England's urban hierarchy to rapidly growing centres of industry and commerce: Manchester, Liverpool, Birmingham and Leeds. Liverpool grew from 1,500 in 1670 to 22,000 by 1750 thanks to its roles as a port trading with the New World and an industrial centre[39]. Bristol maintained its position by growing for similar reasons, from 12,000 in c1600 to about 20,000 by 1700 and 64,000 in 1801[40]. Birmingham, Leeds and Manchester were the centres of newly populous industrial regions, and grew at least as rapidly: Birmingham from a market town of under 6,000 at the Restoration to a provincial capital of 24,000 by 1750 and 69,000 by 1801[41]. The important county centres below these provincial capitals numbered about sixty at the beginning of the eighteenth century. Most grew, thanks to their importance as centres for polite society, administration and commerce, but the most successful were those which were also industrial centres or ports. Of the 6-700 towns which were smaller still, those which were purely agricultural marketing centres declined in some cases, whilst those which were industrially successful, were resorts, or were commercial or naval ports, grew healthily[42].

The fortunes of all towns were closely related to those of internal trade. Urban and commercial growth created many new demands, and in some cases trade routes were a key reason for urban success, as at Bristol and Liverpool. Even in the middle ages, it has been said, good river communication could bring economic success to a town[43], and of the 32 towns and cities in England and Wales with populations over about 5,000 in c1700, only nine were neither on navigable rivers nor the coast[44]. Changes in the fortunes of all towns created changes in their demands and must have had important effects on patterns of trade.

The seasons dominated many economic activities, although much remains to be understood about seasonal variations in pre-industrial life. Most agricultural activity concentrated in the months from April to October, and was followed by activity in the processing of crops, such as brewing, concentrated in the autumn. Crafts and domestic industries were concentrated into the winter months, when less labour was required on the land[45]. Some more centralised industries operated mainly during the winter for other reasons: for example the iron industry and others which required water power tended to concentrate in the wettest months. Coalmining seems to have continued all year round, but the coal trade was seasonal, being heavily concentrated from about April to September[46]. The holding of markets for crops also provided the opportunity for other goods to be sold, and the seasonal pattern of markets naturally created seasonal patterns in trade as a whole.

Fluctuations in the weather from year to year caused great variations in harvests. Hoskins suggests that in the whole period from 1480 to 1759, 25% of harvests were deficient, 16% were very bad, and nearly 40% were good[47]. Good and bad harvests were evenly distributed at a secular level, but tended to cluster into consecutive years of good or of bad harvest owing to climatic patterns and the availability of seed. Bad harvests became no less frequent. However it seems that the population was increasingly insulated from their worst effects as agricultural production and trade improved and population levelled off. Since harvest successes and failures often did not affect every region or crop in the same way, internal and foreign trade could compensate for them. Some long-term changes in climate must also have had important influences in this period. Evidence of climatic change shows that the period from about 1550 to 1700 was the depths of a 'Little Ice Age' which extended in influence from about 1420 to about 1850[48]. In the late seventeenth century mean annual temperatures are thought to have been some 0.9 degrees Celsius (1.6 degrees Fahrenheit) below those of 1920-60. This resulted in a greater frequency of cold, wet summers and of cold, wet winters. The Thames in London was frozen over at least 11 times during the seventeenth century[49], and it was unusual, but not extraordinary, that in the winter of 1740-1 the canalised

waters of the Aire and Calder Navigation were frozen for four months. In this case and perhaps others bad weather not only frustrated trade but stimulated investment in turnpikes.[50]. Individual meteorological events could also bring variations in economic activity, for example storms which stopped or destroyed shipping, droughts which prevented use of water power, or floods which damaged bridges and navigation works. The frequency and severity of storms seems to have been increased during the Little Ice Age. For example on 7-8 December 1703, 8,000 people were thought to have been killed during a great storm in southern England[51].

Such natural factors combined with human ones to create fluctuations in economic activity. Individual human events found some expression in economic activity and trade. Urban fires, for example, were frequent and often disastrous[52], and strongly affected the trade of the regions where they occurred. In the case of the Fire of London in 1666 the disaster affected the trade of the whole nation. Outbreaks of plague could have similarly debilitating consequences, though with the additional complication that they discouraged any travel, which might spread the disease. Financial crises could occur for many reasons, for example in the wake of the South Sea Bubble in 1720[53] or the lending crisis of 1672.

Finally, war was an important factor creating fluctuation as, whether in England or abroad, it could interrupt the flow of trade, thereby affecting supply, demand and prices[54]. Even the threat of war was liable to change trading patterns, whilst war itself would often cause trade to break down completely in some sectors, and to flourish in others[55]. Indeed the effects of war on trade could be extremely complex and diverse. William Stout of Lancaster recounted some of these effects in his autobiography, discussing trade in 1689 and 1691-2[56]. He pointed out that trade stopped with France had saved the nation at least a million pounds in expenditure on French goods, whilst alternative sources or substitutes for them had been developed in England, or else imported from the colonies or other parts of Europe. Another effect he noted was that as coastal trade from London was put at risk, industries were developed in the north of England to provide alternative sources of commodities such as copperas. Other goods were carried by land for safety despite the greater costs incurred.

Trade was disturbed by the effects of the English Civil War periodically between 1642 and 1651, though it perhaps damaged home consumption more than exports[57]. The Anglo-Dutch War of 1652-4 and the Spanish War in the late 1650s both hindered trade at times, though the mercantile prosperity of the decade was generally good. The Anglo-Dutch Wars of 1664-7 and 1672-4, the war with France of 1689-97, the War of the League of Augsberg from 1686 to 1697 also had effects, although their complexities remain to be explored. The War of Spanish Succession from 1702-13

caused overseas trade to fall between 1704 and 1708[58]. The Jacobite rebellion of 1715 appears to have caused disturbances far removed from the areas of action[59]. Further disturbances occurred in 1734, through War with Spain in 1739 and 1741-8, and the Seven Years War of 1756-63.

Jones has suggested that 'the middle of the seventeenth century seems the most appropriate starting point for the infinitely expansible improvement of farming practice', with crucial innovations such as the diffusion of new field crops and the floating of water meadows[60]. One of the most significant results was that a national shortage of grain in the late sixteenth century was converted into a growing surplus during the seventeenth and eighteenth, in spite of the vastly increased population[61]. Agriculture in this part of the pre-industrial period has been a subject of much research, a great deal of it focused in the successive volumes of *The Agrarian History of England and Wales*[62]. The most important changes took the shape of enclosure and other changes in land-holding, changes in the organisation of agriculture, the introduction of new techniques of husbandry, and the introduction of new crops. New crops were perhaps the feature of change most directly visible in trade. They were introduced in disparate ways, varying regionally in date of introduction and manner of diffusion, and taking a long time to span the gap between first innovation and general adoption. Root crops such as turnips, carrots and potatoes appear to have been taken up in the seventeenth century in East Anglia but not until c1700 in Worcestershire, c1770 in peripheral counties and even as late as 1800 in Wales; grasses such as clover, sanfoin and rye-grass were taken up on light soil areas first in the 1670s and '80s, and in the clay vales in the following century[63]. The wider structural and technical changes in agriculture must also be expected to be reflected in trade, as the volume of production varied and as regional agricultural specialisms were altered in their balance. Most authors have suggested that the changes amounted in significance to an 'agricultural revolution', but there has been little agreement on the delimitation of the period when this occurred. Kerridge suggested the dates c1560-1767[64], Jones and John placed the most important change c1650-1750[65], and Mingay has drawn out his own period of greatest development from 1650 to 1880[66]. Such confusion arises largely from the lack of general source materials to give a picture of many different aspects of agricultural advance, and the diverse views which can emerge from studying different sources or regions[67]. Quantitative data about the trade in agricultural commodities can potentially make an important contribution.

Studies of agricultural markets and trade have made it clear that important changes were also taking place in the mechanisms for the exchange of agricultural produce. Changes in regional population, the growth of towns[68], and the expansion of

London in particular[69], created new patterns of trade, and there has been much debate about the extent to which a national market for different crops developed during the late seventeenth and early eighteenth centuries[70]. It is clear from the work of Everitt and Chartres that whilst the numbers of markets and fairs grew, there was an important structural shift away from them as a focus of agricultural trade to much more private marketing of produce, with the rise of the middleman in many trades, working from urban inns or through circuits of contact[71]. This naturally had effects on the geographical patterns, volume, types and seasonality of produce traded internally.

The pre-industrial period also saw many changes in the nature of industry, but the decline in the influence of guilds, seen as of crucial importance by historians in the early years of this century, for which the Civil War decades were also seen as the watershed, has been recently seen as more the result than the cause of economic expansion. Other changes took diverse forms, but essentially were concerned with the introduction of new industries, the improvement of technology, the increased capitalisation of production, and the spread of industrial activity to a larger proportion of the population. Dual occupations grew in several areas in domestic industries, such as textiles and metalwares, and provided new and important prosperity for individuals and communities, increasing the volume of internal trade. Many of these domestic industries were controlled by merchants who developed an increasing hold over their industries and amassed capital with which to invest further[72]. Several industries with high levels of concentrated fixed capital also developed. The iron industry expanded, for example, following a slight recession in the mid century, with a steady growth in pig iron production from the 1670s to the 1740s, and then accelerating expansion into the industrial revolution[73]. The coal industry increased its output markedly from the sixteenth to the eighteenth centuries as new uses for coal were found and as the techniques and organisation of its production improved[74]. In these industries as in others, such as non-ferrous metals mining and working, the picture of aggregate growth was composed of strong regional shifts: for example the rise of the northern textiles industries and the relative decline of their Welsh and West Country counterparts; or the collapse of iron smelting in the Weald and its growth in the West Midlands[75]. The picture was also composed of increasingly complex regional relationships and specialisms, with, for example, much greater geographical differentiation of textile production, and a complex inter-dependence of iron producing works and regions providing iron of different grades and stages to one another. As far as internal trade was concerned, many of these changes in industry were of crucial importance. New industries created new products to be carried, and demand for raw materials to be carried for them. Changes in regional emphasis and growing regional specialism made

it necessary for many goods to be transported increasingly long distances, and the growing output of many industries was reflected directly in increased trade.

To survey personal incomes and prices in the pre-industrial period is difficult. There is a lack of reliable sources whose relation to 'average' prices and wages is clear. Most 'real' incomes did not consist of wages alone, and there was enormous variation between individuals. Prices varied enormously between goods of different qualities, and there were infinite varieties of cost price, wholesale price, retail price or residual price, for example. Nevertheless, some general trends have been reasonably clear since the pioneering research by Phelps-Brown and Hopkins[76]. The most important conclusion is that in the period from the mid seventeenth century to the later eighteenth, prices were overall remaining fairly stable while wages grew. It seems that after a long period of decline in real incomes with the population growth and price inflation of the sixteenth and early seventeenth centuries, incomes began to advance in real terms from the 1670s. This was true probably of the monied classes because of increased rents, new possibilities for investment, and rising agricultural and industrial productivity; and for the mass of the population because of the spread of domestic industry, which gave an additional income in many areas, labour shortages causing wage increases and the cheapness of basic foodstuffs. After a rapid rise in aggregate prices up to the mid-seventeenth century, prices were stable or falling from then until the mid eighteenth century, when they began to rise again. The period of Tudor and Stuart inflation had not embodied even rises, agricultural products growing in price much faster than industrial ones, even though inflation in industrial goods seems to have continued longer[77]. By the late seventeenth century industrial products therefore had a much lower cost relative to agricultural ones than before, and this increased the market for industrial goods when incomes began to rise in real terms. There were also important variations in prices from year to year and season to season which significantly affected demand. This was particularly the case for grain prices, which responded to poor harvests by rising and to good harvests by falling, and which were higher towards the harvest than after it[78]. Prices of the essential foodstuffs not only affected their own levels of consumption, but also other products for which demand was elastic and at least partly determined by disposable income remaining after food had been bought.

The improvement in disposable income at the same time as moderation in prices and overall growth in population expanded the market for internal trade: allowing for the purchase of rare luxuries and a variety of new consumer goods by the better off, and of more, and more varied, wares for the mass of the population also. Increasing incomes were reflected in a wider spread of ownership of many goods, and the development of what Thirsk has called a 'consumer society'[79]. Several writers have

used probate inventories to show the increasing diversity of goods in homes of all classes during the seventeenth and early eighteenth centuries[80]. Spufford regards the latter part of the seventeenth century as a crucial period of expansion in consumer demand, constituting a 'great reclothing' which was continued into the eighteenth century and beyond: even for the humble cottager, 'their linen cupboards, their clothing and their "luxuries", which were not strictly necessary to survival, like cushions and bed and window curtains, had risen dramatically at the end of the seventeenth century'[81]. This seems to have been a specifically English phenomenon at the time, and must be regarded as one of the dynamic factors in the period preceding the first industrial revolution[82]. Once the process had been begun, Spufford argues, the growth of consumer goods could continue apace during the eighteenth century[83]. In addition to providing new opportunities for personal comfort, this general trend also provided new opportunities for the growth of manufacturing, for example in the west midlands metalware districts where new trades of toymaking, japanning and enamel box making were introduced alongside traditional crafts such as buckle, nail and lock making[84]. All such new goods and new quantities of goods can be seen in the records of internal trade, and undoubtedly provided new opportunities for merchants and carriers.

The foreign trade of England was revolutionised during the pre-industrial period. Between about 1490 and 1560 the scale of the world as known by Europeans was utterly transformed by voyages to the Americas, the Indian Ocean and the Far East[85]. By the seventeenth century, colonisation and trade with these areas had developed, and massive increases in the importation of exotic commodities had taken place. This growth was parallelled by a great increase in trade within Europe, the cloth exports of England growing markedly first, followed by a wide range of manufactures, and many foreign goods being brought back in return. By the mid eighteenth century, the success of English colonies had reached levels which sustained significant demand for English goods, as well as providing valuable imports and re-exports. Connections with the new world were so important that even by 1700 re-exports from Asia and America accounted for one third of England's exports[86]. The expansion of trade into new regions had given great advantages to England and other western seaboard nations[87]. Since the closure of Antwerp as a port in 1585 direct trading connections had been developed all over Europe and the Levant[88]. Growth was assisted by the success of English shipping, which benefited from colonial connections and from the policies of the Navigation Acts as well as from the advance of English production: trade benefited from the growth of shipping, and shipping from the growth of trade.

The shift in the spheres of English trading involvement was parallelled with a shift in the fortunes of individual ports. Those with a strong role in the new trades

developed whilst those which were poorly placed or had particular problems of silting or local industrial decline were liable to decay. Overall, however, there was an important shift in emphasis away from London, which totally dominated foreign trade before the Civil War, towards the provincial ports. Ports on the west coast in particular had great opportunities to benefit from development of trade with Ireland, in coal and manufactures in exchange for primary produce, and with the New World. Bristol and Liverpool were the outstanding beneficiaries of this trade, and their changing influence was felt strongly in internal trade, but other ports such as Whitehaven and Barnstaple made notable strides. Ports of the east coast, most notably Hull, were stimulated by the increase of trade with the Baltic, and the south coast ports such as Southampton and Exeter even managed to wrest trade with western Europe from London. This was partly a result of the breach of the old London-Antwerp mercantile axis, but also of appalling congestion in the port of London which was not reduced until the creation of wet docks in the late eighteenth century. In the first half of the eighteenth century, by contrast, while the total tonnage of shipping leaving London remained static, that from the provincial ports combined nearly doubled[89].

The changes in the geographical patterns of foreign trade brought a great diversification of imports and exports. Ramsay has suggested a shift in the character of English exports from raw materials only in the later middle ages to a wide variety of woollens by the late sixteenth century, and many other kinds of manufactures such as ironmongery, cutlery and glassware in the seventeenth, together with re-exports of colonial commodities such as tobacco, sugar and slaves from the mid century[90]. The range of exports was added to in the eighteenth century with greater agricultural productivity and the growing success of diverse industries. The vast majority of these goods, with the exception of the re-exports, were necessarily a component of internal trade also, having to be collected for export or distributed on importation.

English overseas trade was assisted by many developments in finance and commercial organisation with which it was bound up. The rise of the great trading companies in the late sixteenth century was one of these, governing trade with distant regions such as the East Indies and the Levant as well as nearer shores such as those of the Baltic, administered by the Eastland Company from 1579[91]. The creative role of these companies is doubtful, and it is argued that they hindered trade in many ways up until their gradual dissolution or decline in influence towards the end of the seventeenth century[92]. However, their ability to raise capital proved of great benefit in opening up certain trades, such as the slave trade and north American fur trades in the later seventeenth century[93]. Other financial and commercial changes affected both overseas and internal trade. The most important of these was the development of methods for

raising capital and obtaining loans. The development of business partnerships helped significantly in providing capital for trade and industry and for spreading risks. These came about to an increasing extent after the Civil War in the forms of formally agreed business partnerships as well as continuing informal and family-based ones, although merchants also continued to work alone to a high degree. The rise of insurance was of great importance in spreading trading risks, especially in long-distance voyages covered by marine underwriters more and more commonly from as early as the 1540s and by mutual associations of ship owners by the late eighteenth century[94]. The same principles passed into the protection of goods and stock in trade against fire by corporate companies from the late seventeenth century[95]. Money for investment in trade could be obtained through loans as well as partnerships. These began with money-lending by usurers in the old-established way, but loans became much more widely available to merchants, and more cheaply, during the seventeenth century: from bankers, goldsmiths and the legal profession as well as other mercantile sources. Loans such as these were included in the wide range of credit which by the end of the seventeenth century, according to Defoe, was to the merchant 'as marrow to his bones'[96]. The banks which could lend money to traders expanded rapidly in London from the end of the seventeenth century, and provided an important service in the City. Formal banking however remained centred almost exclusively in London until the mid eighteenth century, when a burst of new banks became established in provincial towns[97]. The banks were of perhaps even greater importance as part of the developing mechanisms for credit between traders. At their simplest, they took the form of banknotes and token coinage which helped to ease money supply bottlenecks as well as assist payments. These grew in use alongside an increasingly complicated but flexible system of private bills of exchange which oiled the wheels of commerce especially effectively from the 1660s onwards[98].

Such commercial developments were crucial to the patterns of both internal and foreign trade. However another influence of great importance in internal trade was the increasing diversification of roles played by individuals in trade. This has been referred to by Westerfield as the development of a new trading and mercantile class characterised by the 'middleman'[99]. It included an increasing diversity of specialists from the 1660s, such as factors, jobbers, merchants, carriers, and packers. In addition, there was a rapidly growing pool of accountants, shipping brokers, commercial lawyers and financiers. The introduction of a new mercantile system of organisation was far from total, however, and much trade was still carried on by more ad hoc and localised means. As Chartres has written, the period from 1500 to 1700 saw 'the dwindling of the fundamentally medieval methods of internal trading, and the growth of more

advanced mercantile structures: but it saw neither the disappearance of the one, nor the triumph of the other'[100].

Another organisational change of importance was the development of marketing mechanisms. The gradual decline of markets and fairs in direct trade has been mentioned in relation to the development of agriculture. This was parallelled by a transition from entirely periodic to permanent marketing in shops. This seems to have begun in about 1550 and proceeded slowly during the seventeenth century, but then accelerated rapidly in the eighteenth. By the end of the period, most small towns had mercers who stocked a wide variety of retail goods, and many also had other specialist retailers such as grocers and ironmongers[101]. Chapmen and peddlers also increased in prominence during the period, providing an important alternative to the traditional markets and fairs, and taking new consumer goods in particular to dispersed markets[102].

A series of changes of significance in internal trade concerned physical means of transport. It is clear that throughout the period a great deal of internal trade relied simply on carriage by packhorse or waggon over tracks and customary roads[103]. Bridge-building, efforts to keep roads in good repair, and the introduction of new designs of waggons, all helped to smooth the passage of overland trade, and seem to have reduced costs progressively from the mid sixteenth century. The turnpiking of roads and the construction of new roads under turnpike acts began in 1622, and a great proliferation of new schemes brought a dense network of improved roads to most parts of the country between about the 1690s and about 1770, by which time there were 500 turnpike trusts operating 15,000 miles of road in England and Wales[104]. More regular services began to operate over these roads, including stagecoach services which carried essential commercial information with speed, and carriers' waggons operating local and longer-distance services, and frequent services to and from London. The latter appear to have grown in number by nearly 50% between about 1680 and about 1770[105]. In the context of mineral transport, a significant improvement was also made during the seventeenth and early eighteenth centuries by the introduction of the waggonway, which provided cheap bulk transport of coal between mines and wharves in Shropshire, Tyneside, South Wales and elsewhere[106].

Writers on the subject have consistently emphasised the importance of waterway transport in the period, especially in carrying bulky goods over long distances. Canals only appeared as a significant force in English transport at the end of the period studied here. However rivers were in wide use for transport from time immemorial, and Willan has shown that significant improvements were made from the 1660s onwards. In the early seventeenth century, England had nearly 700 miles of

navigable river, including the Thames, Severn, Trent, Yorkshire Ouse and Great Ouse, but by the 1720s, it had nearly 1200 miles owing to improvement schemes on rivers like the Warwickshire Avon, the Weaver and the Aire and Calder[107]. Given the cheapness of river carriage, such schemes made important savings in transport costs for the regions they served. The coasting trade was also of considerable importance, given the accessibility of so much of England and Wales to the coast, and the cheapness of water transport for bulky goods. Willan has shown the widespread use of coastal carriage and that significant developments took place in the seventeenth and eighteenth centuries in the sizes of vessels and numbers of services provided[108]. It is clear that there was phenomenal growth in the capacity of English coasting in the sixteenth to eighteenth centuries. Although precise estimates are not possible, it seems that between about 1580 and about 1700 alone capacity grew by at least four times, or more than six if coal shipping is included[109]. Greater carrying capacity of vessels and more frequent journeys suggest that productivity of each vessels rose also, perhaps most importantly in the north-eastern coal trade[110].

The character of internal trade was influenced by broader developments in the economy which have been described. The increasing population, and its redistribution into particular regions and especially into towns, was creating new demands for the transport of many goods and new geographical patterns of trade. Increasing regional differentiation in agriculture and industry, together with higher productivity in both, and a much wider range of crops, raw materials and products, was creating demands for the carriage of new goods, carriage over longer distances, and more complex flows of commodity supply. Changes in the relations of incomes and prices assisted in the development of a consumer society which required long-distance trade in many goods, and helped to stimulate a burgeoning of the numbers of goods produced and traded. Increased contact with a wider world and England's leading role in colonial trade created a boost to the range and scale of commodity carriage, whether of goods domestically produced or consumed.

In addition to being affected by the wider developments in the economy, internal trade was necessary to many of the developments that took place, and its abilities to serve the economy helped determine the developments that could take place. Internal trade was responsible for ensuring supplies to the growing population, provisioning the rapidly growing towns and thriving regions of dual occupations, supplying raw materials for industrial growth, marketing the produce of agriculture and industry, and permitting the full benefits to be accrued of the integration of the English economy with its colonies. These changes, and the organisational and productive changes with which internal trade

was directly associated, were integral and important parts of the modernisation of the English economy in the pre-industrial period.

It is clear that the study of internal trade is central to understanding of numerous issues. It is important both in its own right, as a factor in economic modernisation, and for the light that evidence about trade can shed on changes to which it naturally responded. Many of these are matters of strong current concern to historians. Perhaps the most significant is the debate over the scale and organisation of industry, and especially that concerned with the origins of rapid industrial development and the theory of 'proto-industrialisation'[111]. The introduction of new industries and new technologies has continued as an important subject of study in pre-industrial economic history for three generations[112]. Similar attention has been paid to changes in agricultural products and their marketing[113]. Another particularly flourishing area of research since the early 1970s has been the development of urban economies in the pre-industrial period and their changing trade relations with one another and their surrounding areas[114]. Only recently raised to prominence has been the process of regionalization during the pre-industrial and industrial periods. Interest in this field owes its origins to the emphasis of the proto-industrial model on the regional character of industry, to attempts to define urban hinterlands, and to the appreciation that changing regional structures were an important concomitant of industrialisation[115]. Among other areas of interest to scholars in recent years have been the extent to which a consumer revolution occurred in the seventeenth and eighteenth centuries, creating a demand for a growing diversity of luxury goods throughout the kingdom[116], and the complete re-evaluation of the transport system, which has focused increasingly on the relation between improved transport and the growth of trade[117]. With so central a role in the economy, trade in the seventeenth and eighteenth centuries should be regarded as something of a 'foundation subject' upon which an understanding of many others can be based.

iii. The study of internal trade

It is clear that internal and overseas trade, taken together, were vital mediators in a large part of the economic change which affected pre-industrial England and Wales, the evidence for which strongly supports Braudel's evaluation of trade as a whole world between the world of production and the world of consumption. Internal trade, in particular, is now recognised as having been especially important in economic development. Chartres has laid the ghosts of political economists before Defoe who influenced much historical writing with their opinion that internal trade was an

unimportant distraction compared with foreign trade. According to them, it was the latter which generated real wealth and, according to many historians, was one of the crucial factors which gave Britain its advantage in the industrial revolution[118]. Such interpretations have attracted historians with minds conditioned by knowledge of the export-led economies of the nineteenth and twentieth centuries. It is true that overseas trade generated real wealth for some people, which was partly re-invested in England[119], and it provided beneficial new goods, and generated some significant new economic institutions to deal with its special risks and problems; but Chartres has pointed out that internal trade was much larger in volume, and that it too had dynamic effects within the economy. Ashton quoted one contemporary, who observed, 'The home trade is with good reason believed to be a vast deal greater in value than the whole of the foreign trade, the people of Great Britain being the best customers to the manufacturers and traders of Great Britain'[120].

Yet the bias toward foreign trade in many interpretations of the period has continued. The volume of literature on internal trade pales into insignificance beside that on overseas commerce; and whilst most writers on the economic history of the period have tended to give some space to discussion of internal trade, the space and prominence given to overseas trade has been much greater[121]. This neglect has continued largely because the availability of sources has tended to encourage research on overseas trade, which is well documented with accessible aggregate data. By contrast, the vast majority of internal trade is hidden from the modern historian. Much of it was of such a small and localised scale that it slips entirely through the historian's net. Far fewer inland traders, because they operated over shorter timescales and distances than overseas merchants, found it necessary to compile detailed records of their activities, and had less need to retain them. As there were no internal customs, the government too had no reason to keep any account of internal trade, except, in the case of coastal Port Books, to keep a check on the payment of foreign duties.

Nevertheless, far the largest part of trade in England and Wales was entirely internal. Gregory King suggested in 1688 that 93% by value of all agricultural and industrial production was for internal trade alone[122]. Similarly, Chartres has estimated that 90-96% of Gross Domestic Product at the end of the seventeenth century was generated by internal trade. He suggested that '... the great bulk of domestic products was destined for the home market.' 'No assessment of the English economy in this period can be complete without an analysis of the state and development of internal trade. By many measures, it was of greater significance than the foreign trades which have been discussed so much more extensively by economic historians.'[123].

Even the strongest export industry of the nation, the woollen trade, is estimated

to have relied for 61% of its sales on the home market in the early seventeenth century. Other industries, for example coalmining or malting, and also agriculture, were undoubtedly much more tied to the home market than this. Indeed only a tiny minority of products could have borne the cost of transport to foreign markets and still sold at competitive prices. Moreover, the foreign trade of the nation almost without exception found some expression in internal trade. Exports had somehow to find their way to the ports for shipment, and frequently depended on the internal transport of raw materials for use in their preparation. Imports were destined not only for the ports themselves, but for internal markets, and therefore had to be distributed throughout the kingdom to their places of consumption, with considerable add-on costs from processing and transport. Spanish wool, for instance, had to be carried to wool traders in various inland regions where the woollen industry was located; imported sugar was consumed in all parts of the country once it had been refined. Only the re-export trades did not find some expression in the internal trades of England. Although these were highly profitable and important to certain centres, such as Bristol and London, their importance compared with the volume of internal trade must have been even smaller than their share of National Product would suggest. They were a drop as compared with the ocean of internal communication.

Internal trade also had important spinoffs for the wider economy. During the seventeenth and eighteenth centuries it resulted in the improvement of roads and river navigations, the construction of more and better wagons and river vessels, the construction of thousands of ships for the coasting trade, the growth of mercantile communities, the development of internal business and news communications, and the introduction of new credit facilities and provincial banks. The internal trades employed a large and increasing number of people and created wealth for many. They also provided new goods for the population and for producing industries. Whereas overseas trade could benefit the nation only as producer or consumer, the internal trades could create work and wealth for the nation as both producer and consumer simultaneously. Hence the government from the sixteenth century onwards was intent on limiting foreign trade in certain commodities, such as raw wool, which would reduce the revenue to the nation from manufacturing at home. Since even in the nation's biggest export trade, the major market was internal, the spinoffs from internal trade must indeed have been valuable.

The main parallel with internal trade in terms of its importance as a 'foundation subject' for broader studies of the economy is probably population history, the study of which has produced the vital statistics of population, fertility and mortality from which

students of many other social and economic themes have been able to develop their arguments. Understanding of many matters must rely, in part, upon empirical knowledge of trade between regions, along transport routes, between towns and their hinterlands, and between merchants and domestic workers. And yet the study of internal trade has not been served in remotely the same way as has population history by the attentions of scholars. Demographers have undertaken organised, co-operative studies of English population history for several decades, and have published innumerable discussions and case studies throughout the historical journals and the specialist *Population Studies* and *Local Population Studies*; several important books have been published on the topic, along with an outstanding quantitative summary of the *Population History of England*[124]. Agricultural history, another foundation subject of English economic history, can also be said to have received deservedly concerted attention, having its own journal, *Agricultural History Review*, many individual books published on the subject or aspects of it in the last generation, and the extraordinary achievement of the *Agrarian History of England and Wales* project, which has provided the subject with a massive and sturdy empirical foundation including a substantial quantitative element[125]. Trade has by no means been well served, however, and especially internal as opposed to overseas trade. Ashton in 1959 bemoaned the fact that economic historians were forced to rely on statistics of overseas trade in trying to gauge the fluctuations of the economy. He warned that, 'the upward and downward swings in overseas trade show irregularities produced by political incidents. There are no figures representative of the internal trade of the country.'[126] Westerfield's comment in 1915 is almost as true today, that 'statistical data for internal commerce are almost entirely wanting'[127].

The studies that have been undertaken of internal trade in pre-industrial England have been disparate. No specialist journals exist concerning the history of internal trade, and the only book attempting to bridge the subject as a whole has been Chartres's pamphlet, *Internal Trade in England 1500-1700*[128]. Important contributions have been made to the study of individual topics, but important gaps remain and little exists to provide a quantitative base for any aspects of the topic.

One of the best served areas of the subject has been the study of transport history. In this field, the pioneering surveys by Pratt and Jackman has been followed by a series of general works, though all these have tended to be more concerned with the period thought of as 'the transport revolution' in the late eighteenth and early nineteenth centuries than with that which preceded it[129]. This literature has been concerned with issues of improved transport provision, and with modes of transport and costs, but not with patterns, volumes or goods of trade. It has been added to by

numerous valuable studies of particular modes of transport. It is ironic that perhaps the most wide-ranging study of an individual transport mode, which discusses investment, utilisation and economic importance, has concerned the mode least widespread in the period, the railway[130].

The study of roads has been enormously developed in recent years, as a result of the studies by Albert and Pawson of the diffusion of turnpike roads, although these, too, have not been concerned with trade and its changing character as it used the roads[131]. Chartres, Turnbull and Gerhold have attempted to indicate the growth of road services, but their estimates have concerned primarily London services and have not addressed the kinds of goods carried or the patterns of trade[132].

Research into inland waterways, similarly, has overwhelmingly been concerned with the improvement of networks and physical operation rather than with the volumes, goods or patterns of trade. The principal work on the subject, even after nearly sixty years, remains Willan's *River Navigation in England*, which is concerned mainly with the river improvement schemes of the seventeenth and eighteenth centuries and has only short sections on boats and boatmen, and a few pages on costs of carriage and cargoes. Hadfield, in *British Canals* and his series on the waterways of the British Isles, is also concerned principally to set out the development of the waterways network and the business history of their undertakers. Individual studies of particular river navigations, of which there have been many, have been also concerned with improvement and operation, but seldom with trade[133]. Only a few studies have attempted to examine the trade carried by river navigations in any detail[134], and understanding of the goods carried has tended to be limited to inadequate generalisations concerning coal and corn alone[135]. Prior's study of *Fisher Row* is the only significant study of the work and society of a boatmen's community.

The coasting trade is the most extensively served mode of transport, perhaps owing to the absence of network improvements to monopolise the eye of the historian, and to the presence of plentiful evidence in the coastal Port Books. Most studies of coasting have focused heavily on the trading roles of individual ports rather than the provision of transport services. The only substantial study of the growth of English shipping capacity and methods is that by Davies thirty years ago, and this does not succeed in identifying the separating specifically coastal shipping from the development of shipping as a whole[136]. In addition, Willan has provided some valuable comment on the development of specifically coastal shipping[137]. The coastal trade has been virtually the sole mode of transport for which quantitative studies of goods carried have been undertaken. The coast has often been regarded as 'the main highway of the British Isles'[138], and the most recent national survey of

coastal shipping suggests that it '...played an indispensable part in the growth of Britain's internal trade in the two centuries before 1760'[139]. Valuable though studies of the coast are, it must be remembered that far more trade, much of it over short distances, must have been carried by inland routes of various kinds, and over-reliance on data concerning the coast may produce a serious bias in understanding of trade.

By far the most numerous and valuable studies of coastal trade have been those which have used coastal Port Books. Willan's study was responsible for developing interest in the source. He examined a large number of the books, and used them in a generally non-quantitative, illustrative manner to investigate boat sizes, the activities of merchants, and the nature of trade in different commodities and at different ports. He made some calculations of the quantity of trade in some commodities at particular ports for a few years.

Several studies have been made of the trade of particular ports as revealed by coastal and/or overseas Port Books. In some cases these have been included within broader studies of ports or of the trade of a region. The most important of these include studies of Hull[140], of Boston[141], of King's Lynn[142], of the ports of Kent and Sussex[143], of Southampton[144], of the ports of the Exe estuary[145], of Plymouth and the Cornish ports[146], of Bristol[147], of the harbours of Severn estuary[148], of the Welsh ports and the creeks of Pembrokeshire[149], and of Chester[150]. The depth and quality of studies has varied from impressionistic surveys to statistical analyses of the trade in selected commodities. Some have been largely concerned with tangential issues such as the structure of merchant communities[151] and the relative prosperity of individual ports. Many have used the source uncritically and without attempting to compensate for any biases or omissions. Most have been restricted to short periods or to a few trades. Most authors have not presented thorough records of a port's activities over a period of time, probably the information of most interest to historians studying associated themes, or tabulated data which expresses the trade in more than the simplest ways.

A few studies have used the records of several ports to shed light on the production and consumption of particular commodities. The pioneers of such studies, were Gras and Nef, who compiled statistics of the trade in grain and coal respectively[152]. Weatherill has made use of the Port Books for Hull, Bristol and four other towns between 1660 and 1770 to contribute to estimates of the production of the English pottery industries[153]. Similarly Burt has employed Port Books to obtain estimates of lead production from 1700 to 1770[154]. Stephens has used the overseas Port Books in a wide-ranging semi-quantitative study of cloth exports[155]. Many studies have used Port Books data in a much narrower illustrative fashion. McGrath has used them, for instance, to assist a study of the supply of food to London in the

seventeenth century[156]. A recent paper by Woodward on the recycling of commodities in pre-industrial England partly illustrates its theme by reference to the Port Books[157].

Beyond these studies of the coasting trade, few studies have attempted to assess trade in a quantitative fashion. One study from the end of the period has attempted to suggest ways in which toll revenue from river navigations and roads can be used to provide indices of economic growth in a region, but this has not been done on a widespread basis or within the period in question[158]. Studies of trade organisation and transport which have looked beyond single modes have been very few. Several regional economic studies have discussed the breadth of trade and transport in the context of many other themes, such as Chalklin's study of Kent, Hoskins' of Devon or Jackson on Hull[159]. The study of the Peak District by Hey is the only one concerned specifically with trade and aiming to integrate understanding of all modes of transport with a study of supply, carriage and marketing of goods. However it was not possible in most of these studies to develop quantitative approaches owing to the paucity of evidence. Similar integration of themes has been achieved with a semi-quantitative basis for individual trades; though these studies too have been few. Examples are Nef's outstanding study of the British coal industry, which examines all aspects of the production, trade and consumption of coal[160]. Everitt's study of agricultural marketing, and Chartres' successor to it, have provided wide-ranging views of trade in agricultural produce; but these and other texts on individual industries have not achieved the same authority over such a wide canvas as Nef, such as Ashton on the iron industry or Kerridge on the textile trades[161].

Research into the nature of internal trade has been uneven in focus, and heavily biased towards evidence for coastal shipping, which may not have been representative of the trade of England. However, a general picture is now emerging, which confirms the importance of the subject and shows the need for further work in particular areas. The most important of these areas, owing to its implications for many thematic studies other than that of transport and trade themselves, concerns the crucial need for studies of internal trade with a quantitative base. This remains unsatisfied principally because of the perceived limitations of the source material[162]. There is a dearth of tractable and widely-relevant evidence about the kinds of goods that were being traded and in what quantities, about the distances over which trade was conducted, and about how and why trade was carried on. Indeed most ideas of the economic history of internal trade in the pre-industrial period have been based to an alarming extent upon the anecdotal evidence offered by Defoe together with some impressions of carriage accounts and

Port Books[163]. Few systematic records of trade exist for the period before the introduction of the railways; and the material that does exist is often in the form of toll records for a few rivers or turnpikes, which give an incomplete picture of trade and usually record money collected rather than the types or quantities of goods carried. Chartres has complained, '...Even the new corporations created in the seventeenth century and later to improve rivers and roads have left little material on actual trades. Thus it is that the historian of inland trade in this period has to rely on fragmentary and rather uncertain materials.'[164]

Many tangential sources for the volume of trade, have indicated that there was growth in internal trade in the pre-industrial period, but none has been definitive. Ideas about the development of internal trade have tended to emerge from estimates of the growth in output of particular industries such as coal, iron, textiles, and agriculture, rather than from any overall measures of trade which can take in the huge variety of other goods and commodities that were carried. All of these newly-produced goods must have added to trade. Some other measures of growth are available, such as the increase of shipping, the improvement of rivers and roads to cope with the new density of traffic, the rise of mercantile communities, and others, but most of these aspects of trade growth have little quantitative value. A few detailed studies have been carried out to measure transported goods, for example calculations of tolls on roads in Yorkshire, cheese carried along coast to London, and coal shipped from Newcastle. However nearly all of these more detailed estimates have focused on the coast, for which Port Books are a major source, and have failed to shed light on inland trade. Further knowledge, from a quantitative base, of the varieties of goods traded is also needed for many purposes. Studies of consumer goods in the home, of particular industries, and of agriculture, as has been stated, have shown that the range of goods and commodities produced increased in important ways during the period. These developments naturally must have found their way into internal trade. However there is a need for much additional evidence of a quantitative kind if the rates of increase in new products and the geographical, seasonal and historical patterns of their adoption is to be better understood. Knowledge of geographical patterns of trade flows, too, is needed for an understanding of changing regional specialisations and divisions of labour within industry and agriculture, of the growth of centres of population and of the changing roles of towns.

It is clear that new studies are needed to fill some of the holes in understanding of internal trade, and to provide substantive data sets which can be utilised in studies of internal trade and of other themes connected with the worlds of production and consumption to which it relates. If such substantive data sets for internal trade are to

be produced, it is clear that new sources and/or new methods for their analysis must be utilised.

iv. Aims of the study

It is clear that the subject of internal trade as a whole is one for which more research is needed if its own nature and its implications for other parts of the economy are to be understood. The most urgent need is for studies of inland trade. Whilst coastal trade has been studied widely using semi-quantitative methods to explore its character, volume and organisation, similar studies have seldom been possible of trade by road or river. Coastal shipping may provide a significant index of trade activity, but its character was different from the inland trades, and it is not a sufficient index of internal trade as a whole. The principal aim of this thesis is to improve knowledge of river trade. Historians have agreed the importance of river navigation in the period, regarding its improvement during the later seventeenth and eighteenth centuries as a significant contributor to the advance of transport. Many writers have stressed the importance for the economic development of regions of being within 15 miles of navigable water[165]. However the importance of river navigation has not been reflected in studies of its conduct and character. Research has focussed on navigation improvement rather than on trade. Few studies of river navigation have discussed trade at length, and these have been hampered by a lack of source material which does more than illustrate trade in the broadest terms.

A secondary aim of this study is therefore to utilise new sources to shed new light on the subject. The main source is the series of coastal Port Books for Gloucester, which provide unique evidence for the trade of a river system in the pre-industrial period. Port Books have been used to study coastal trade for over sixty years, and have provided important quantitative data. They were kept for over 120 ports, and some 8,000 books survive[166]. They have been thought the most extensive trade records in the world before the nineteenth century[167]. However no other series of Port Books records the traffic of a river. Owing to the unusual position of Gloucester compared with other Customs ports, its books provide an unparalleled record of river traffic. This was noted by Willan as early as the 1930s, but few studies have made use of the source, and none has attempted to do so for more than a single port or subject[168].

The third aim, to develop new methods, is concerned with the problems of using Port Books and the desire to utilise them in complex ways. Despite the great potential of Port Books to shed light on economy and society in the pre-industrial period, the

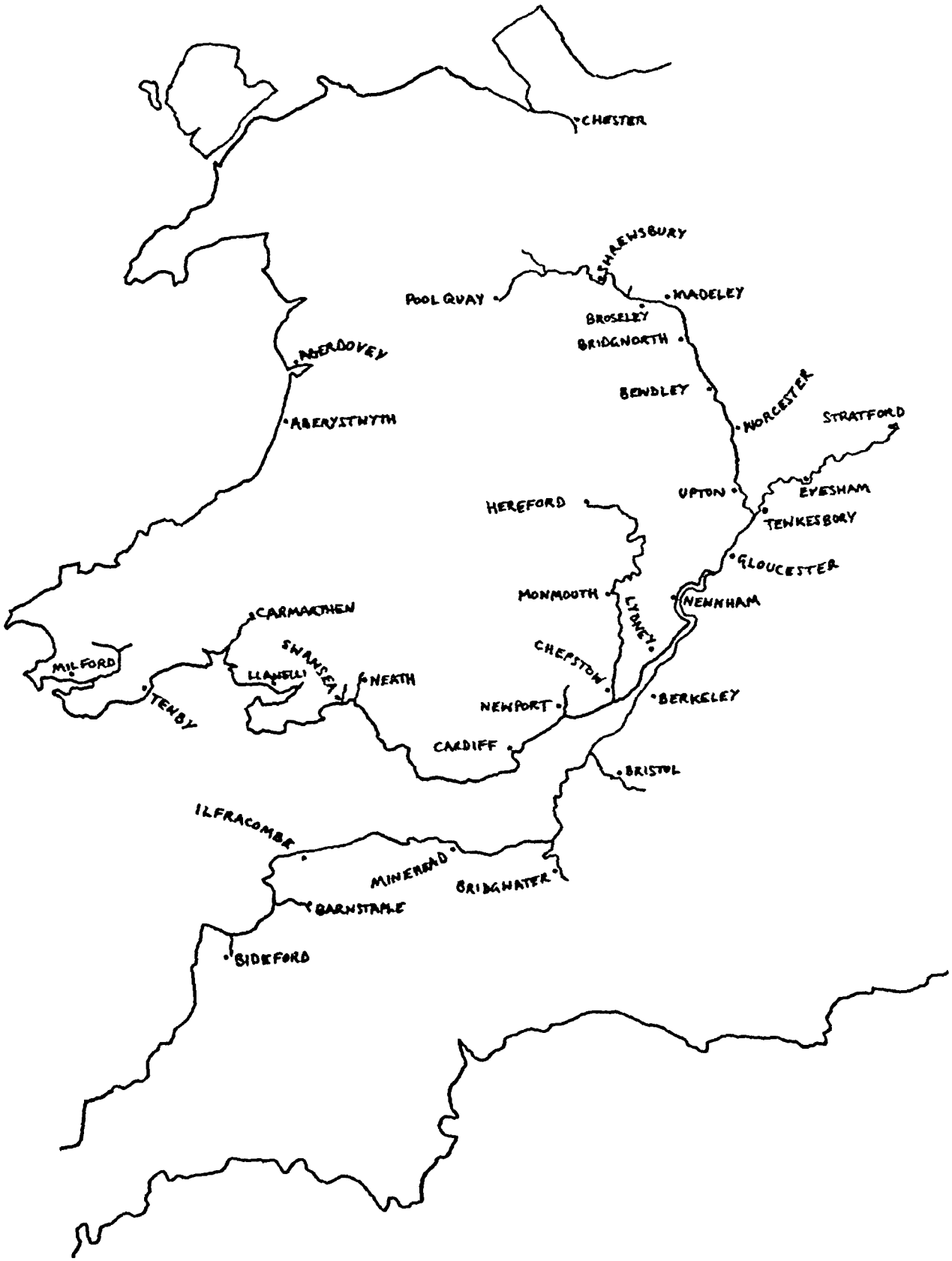
source has been under-utilised in terms of wide-ranging quantitative study. The principal limitations have concerned some problems of interpretation, and the absence of methods for handling the exceptional quantities of data contained. These have meant that studies of internal trade have so far only scratched the surface of the evidence. Even so far-reaching a quantitative study as Deane and Cole's was unable to utilise data for coasting, as the necessary aggregation of data from Port Books had not been undertaken[169]. It is clear that new methods are needed if the Port Books are to be exploited fully. The development of computer databases to store and analyse the evidence makes possible the manipulation of large quantities of data for the first time.

Hoskins has said, 'it is a truism that English economic history now depends upon an increasing number of local studies'[170]. The Severn provides not only a case study of one river, but was one of the most important arteries of trade in Britain throughout the pre-industrial period. It was naturally navigable from Montgomeryshire, through Shropshire, Worcestershire and Gloucestershire to its confluence with the Bristol Avon. The Bristol Channel gave further access to ports like Chepstow and its hinterland of the Wye valley, Newport, Cardiff, Neath and south-west Wales; and on the opposite bank to Bridgwater, Minehead and Devon and Cornwall as well as Bristol itself. The extent of river navigable without improvement was 160 miles, from Pool Quay near Welshpool to Avonmouth. Willan suggested navigation was extended from Shrewsbury to Pool Quay between 1700 and 1727, but there is no evidence of navigation works at this time or that the river was unnavigable earlier[171]. This distance was probably the maximum that could be navigated by any one vessel. Above Pool Quay the river became shallower and was obstructed by a medieval dam; and below Avonmouth the Bristol Channel became increasingly hazardous for flat-bottomed vessels of the kind that could navigate the Severn's upper reaches. For most purposes, then, the river provided a navigable route 170 miles long from Pool Quay up the Avon to Bristol and 5 miles beyond[172].

To this network could be added the Wye, navigable from the Severn estuary below Chepstow as far as Monmouth, and after improvements in the early eighteenth century to Hereford, 70 miles away[173]. Other tributaries of the Severn added to the network on which Gloucester sat. At the head of the navigation, the Vyrnwy seems to have been navigable for a few miles from the Severn[174]. Attempts were made in the early 1660s to make the River Salwarpe and the River Stour navigable towards Droitwich and Stourbridge respectively, though these seem not to have been successful[175]; however the Warwickshire Avon was made navigable for large vessels from the Severn at Tewkesbury to Stratford in 1636[176]. The Bristol Avon navigation

Figure 1.1

The Severn and its navigable tributaries c1770



was extended in 1727 to Bath, an additional 11 miles[177]. A few smaller rivers were navigable at various time for short lengths. The Dick Brook south of Bewdley was made navigable by Yarranton to an iron forge in the 1650s[178]; the Tern in Shropshire was used briefly to reach other forges[179]; and the Teme at Worcester was navigable for one and a half miles from the Severn[180].

The period from c1640 to c1770 covered by this study is regarded as an important and coherent period, beginning with the Civil War and ending, less absolutely, with the onset of industrialisation. The Port Books for Gloucester are available throughout this period. As far as the Severn waterways were concerned, the 1640s had a clear significance as a time of change as elsewhere in England, and as the date when the upper Severn's most important tributary, the Warwickshire Avon, had just been improved. The 1770s can be recognised as the symbolic start of the industrial revolution on the Severn, as marked by the construction of canals which transformed trading patterns. The Droitwich Canal from the Severn was built in 1771. In 1772 Birmingham and the Black Country were connected with the Trent and the Severn, and a waterway route between those two great rivers was created. To these were added connections from the Severn to the Mersey in 1777 and to the Thames in 1789.[181].

The region served by this corridor of trade was large. At its furthest extremity was mid Wales, with commodities such as lead and timber. Shrewsbury was the highest important town, having a large population and a trading role with flannel weavers in Wales and cheese producers in north Shropshire and Cheshire. It served as a port for goods from further afield, including Cheshire salt, Manchester goods, and Staffordshire earthenware[182]. A few miles downstream was the rapidly growing industrial region of Coalbrookdale, from which coal was shipped in large quantities throughout the Severn valley from the late sixteenth century. Coalbrookdale also had ironmaking, lead smelting, pottery and other industries which grew rapidly during the period. The district was served by vessels from the parishes of Broseley, Benthall, Madeley and Buildwas[183]. Bridgnorth was a port with a wider sphere of influence and served both the Gorge and trade in goods such as Staffordshire earthenware, Manchester goods and dairy produce. Below Bridgnorth, Bewdley was one of the most important ports on the Severn, adjacent to the Stour valley and the Black Country with their rapidly expanding glass, fireclay and iron industries. These industries, combined with coal mining there and in Shropshire were in the seventeenth century, according to Court, 'the foundation of the industrialisation of the Midlands'[184]. They provided a large scale and constant trade back and fore to Bristol and the Forest of Dean. Bewdley also served the timber trades of Wyre Forest, and trade routes westward into Herefordshire, and north and east across much of the Midlands. Worcester was the

most prosperous city on the Severn in the period, being at the centre of a prosperous region of corn growing, cider making, woollen manufacture, and salt production at Droitwich. It was also a strategic point for transport to and from London overland.

Tewkesbury lay at the tidal limit of the Severn and the mouth of the Avon. This gave it considerable importance as a place for larger vessels capable of sailing further along the coasts than most river boats. Stocking knitting was a principal activity in the town, and it drew on a large hinterland where corn growing and market gardening were developing in the Vale of Evesham, accessible by the Avon, and corn and cattle rearing in the Severn vale itself. It was also a leading centre of malting, with long-established trade to places as far away as Ireland[185]. Gloucester itself was not a flourishing city in the period. Its hinterland was dominated by corn growing and livestock raising, and weaving in the Cotswolds. The city itself had a pin making industry of importance, and a glass industry as well many more common urban crafts[186].

Below Gloucester the Severn widened into an estuary. On the east bank there was some trade with corn growing districts. On the west bank was the Forest of Dean with small ports such as Newnham and Lydney serving the iron and timber trades of the Forest. Newnham also had a role as a deeper-water port than Gloucester for overseas vessels and larger coasters. Beyond it was Chepstow, on the Wye the other side of the Forest, with its copper and iron industries, its timber crafts, and trade in agricultural produce such as hops and cider from Herefordshire. Further west were Newport with its rising iron and tinplate trades, the town of Cardiff, and the busy coal ports of Neath and Swansea. Trade also came into the Severn estuary from places further west such as Tenby and Milford, bringing oats, peas, oysters and anthracite.

The centre of most of the long-distance trade which passed up and down the Severn was Bristol. By the mid seventeenth century, Bristol was expanding rapidly as a port dealing with the African, West Indian and north American trades as well as other overseas commerce, and imported numerous commodities, including wine, tobacco, sugar, spices, dyestuffs, oil and deals. The city also had a substantial industrial base in coalmining, brass making, glass manufacture, and sugar and soap refining. It was the leading marketing centre for many commodities traded on the Severn, including iron and non-ferrous metals. Such prosperity established a constant trade with the Severn valley, providing the citizens and traders of Bristol with goods and coordinating the supply of goods and materials to the regions accessible by the Severn to the north. West of Bristol along the Somerset and Devon coasts were several important ports which dealt directly with the Severn in commodities such as herrings and wool from Bridgwater, pipe clay and earthenware from Barnstaple, and imported good from both.

Through its connections in regular trade with so many places, the trade region to which the Severn was the key stretched from Devon to Cheshire and from Wiltshire to mid Wales. Many of the most important agricultural regions, towns, sea ports and nascent industrial districts in the country were bound into this trading matrix. The goods carried on the Severn included the produce of all the regions it served, and commodities imported from all over the known world. The area upon which it touched by direct communication was perhaps one tenth of England and Wales.

This Introduction has laid the background of the two worlds of consumption and production, and their connection by the turbulent river of trade. It has shown the need of an understanding of internal trade if a wide range of themes within the economy of pre-industrial England are to be explored, and it has suggested that this need is poorly addressed by existing research. In particular the need for quantitative and qualitative studies of internal trade over a long period has been identified which would permit examination of the volume, patterns and contents of trade, as well as its conduct and organisation. Whereas some research of this kind has been undertaken for the coasting trade, it has been limited by difficulties of extracting and interpreting evidence, and it has not been undertaken for inland transport, which may have exhibited quite different characteristics.

The aim of this thesis is to explore methods by which these needs of research in the internal trade of the period can be answered. By using a unique set of coastal Port Books which portray the trade of one of the most important navigable rivers in Europe and applying novel methods to computerise the source, this thesis will provide new data and interpretations concerning the volume, goods and geographical patterns of inland trade and changes in them over a key period in English economic development. For selected themes, it will attempt to show some of the breadth of applications for such new evidence. In this way it will not only contribute to the studies of river navigation, inland trade and themes which arise from them, but it will also assist in the development of approaches and techniques for the uses of similar records for further research in coastal trade.

CHAPTER 1.

THE GLOUCESTER PORT BOOKS

This chapter reviews the ways in which Port Books have been interpreted and used to date. It identifies problems experienced in interpreting the evidence they contain and the extent to which their potential has been realised. The chapter goes on to evaluate the Gloucester coastal Port Books in particular, addressing the system under which they were kept, their format, their interpretation, and their integrity.

Port Books have been used by many historians to study the overseas and coastal trade of England and Wales, to varying effect. They were made available to scholars in 1911 when they were rescued from a century of neglect at the Public Record Office[1]. The first research using the documents came to fruition around the 1930s[2]. A list of the surviving Port Books was produced in 1960[3], and this, combined with the diffusion of earlier research, encouraged their use through the 1960s and '70s.

The class E190 Exchequer Port Books at the Public Record Office begins in 1565 and ends in 1799. It contains about 20,000 volumes detailing voyages in and out of ports in England and Wales, both overseas and coastally. The books were kept for over 120 ports and lesser harbours around the coasts of England and Wales, and in most cases a majority has survived. About 8,000 are the Customer's and Controller's books devoted to coastal trade and describe voyages in and out of a particular port to or from others in England or Wales. Their purpose was to keep a check on coastal traffic to ensure goods were not imported or exported under pretence of domestic trade, thereby evading duties. The purpose of the overseas books, by contrast, was to control and record duties on foreign and colonial trade.

It is the coastal books which mainly concern this thesis. Each entry in these books described a voyage, giving the date, the name of the boat and its 'home' port, the names of its master and merchant, the ports between which it was moving, and the items and quantities of cargo it carried. At some periods additional information was given, such as the burthen of the boat, persons holding bonds at the Custom House, or further dates relevant to the system of control. For England and Wales as a whole, the surviving coastal books alone contain descriptions of probably over 3 million voyages. N.J. Williams has stated that the Port Books are '...the most detailed system of customs

records of any country, compared with which the Sound Toll Registers of the Danish Kings appear slight and uninformative.'[4]. It is likely they are the most authoritative and extensive series of trade records anywhere in the world before the nineteenth century.

Gloucester was unusual among Customs ports in being positioned at the highest point of an estuary treacherous for sea-going vessels, and the traffic which passed through it was not 'coastal' in the normal sense. The business of most coastal ports was the loading and unloading of ships which sailed between them and other ports, but Gloucester sat on a line of continuous water transport between the Severn valley and the flourishing ports of Bristol and the Bristol Channel. Nearly all the vessels entering and clearing Gloucester were river boats communicating with places further up the Severn rather than coasters which loaded goods at Gloucester itself. Consequently, the coastal Port Books for Gloucester record river vessels at an intermediate point on their journeys, and contain vast stores of information about the River Severn and its inland ports. Willan noted this special value of the Gloucester books in an article in 1937 and his book *The Inland Trade* in 1976, in which he remarked, 'The Port Books for Bristol and Gloucester provide a rare glimpse of what river trade could really amount to in [the late sixteenth century]. If similar books were available for other rivers, the whole subject of river transport would be transformed.'[5]

Similar books, unfortunately, do not exist. The ports at the mouths of other navigable rivers, such as Liverpool, Chester, Hull, London, Boston or King's Lynn, all had Port Books, but unlike Gloucester were readily accessible for large coasting vessels. River boats therefore seldom ventured out of them and on to other ports, but served the port from its inland side. No picture of communication with river ports can be drawn from these books[6].

Not even overseas trade was able significantly to reduce the proportion of Gloucester's trade that was by river. The position of Gloucester so high up a river also obstructed the development of direct overseas trade, and its overseas books show negligible traffic. In the early eighteenth century they contain about two dozen voyages a year, compared with 600 or more in the coastal books. Overseas trade comprised a narrow range of goods, mainly being carried to or from Ireland from the creek of Newnham, a few miles below Gloucester[7].

The significance of the Gloucester Port Books to the study of the Severn is emphasised by the scarcity and fragmentary nature of other sources. A detailed search of national record repositories and of local archives throughout the extended region served by the River Severn has confirmed the findings of previous scholars that little evidence exists which is directly concerned with the Severn before the industrial

revolution. Unlike later transport routes like canals and railways, the Severn had no governing authority which kept records of its use, and there are no toll books or minutes of navigation authorities until the towpath companies of the late eighteenth and early nineteenth centuries and the navigation improvements begun in the 1840s. The Commissioners of Sewers for the counties along the river seem to have concerned themselves almost exclusively with matters of drainage and the dangers from flooding, and the records for the Shropshire Commissioners (which might have been the most revealing) have been lost. Account books of merchants and masters operating on the river have not come to light, though they would be of great value. There is evidence that river merchants kept records[8], but the only known example is so damaged as to be illegible[9]. With no sources except the Port Books concerned directly with the trade of the river, it is necessary to make use of fragmentary references in other sources which shed a side-light upon the trade. Many of these - such as the wills and probate inventories of trowmen, borough records, advertisements in newspapers, references in court records, correspondence and accounts of persons sending goods by river - are of limited use alone but valuable within the context provided by the Port Books.

Port Books have been recognised as a problematic source by many scholars, whilst others have tended to evade the difficulties. Problems of interpretation and evaluation must be tackled if the Port Books for Gloucester, or other ports, are to yield their best rewards.

i. Previous uses of Port Books

The Introduction has discussed studies which have utilised Port Books, and others are listed in the Bibliography. Despite their problems, Port Books have been recognised as a valuable source. However, most studies have been of a minor nature or have used the Port Books in a subsidiary capacity. Only one national survey of coastal trade has yet been based upon the coastal Port Books: Willan's **The English Coasting Trade**, published in 1938. This took a generally non-quantitative, illustrative approach to investigating a variety of themes. Subsequent writers have criticised Willan's methods, which resulted in some misinterpretations[10], but his research probably represents the most extensive use of the source possible with manual methods. Although Willan discussed the system for administering the books at length, he did not examine its impact on variations in the accuracy or interpretation of the Port Books[11].

Many studies have been made of the trade of particular ports as revealed by Port Books, and the most important of these have been discussed already. The depth and quality of studies has varied from impressionistic surveys to statistical analyses of the

trade in selected commodities. Many have used the source uncritically and without attempting to compensate for any biases or omissions. Most have been restricted to short periods or to a few trades. Studies have also been discussed which used the records of several ports to shed light on the production and consumption of particular commodities. Stephens' comments on the information revealed by the source about the textile industries indicate what can be derived from the coastal books about an economic sector: '...the markets served by the different ports and their relative significance, the fluctuations of trade, local and national, the number and names of the merchants involved and the scale on which they worked, and much information about the types of cloth shipped, and when, for example, new types of cloth begin to appear and old ones drop out'[12]. However, like other historians who have used the source, Stephens was able to address only a small number of his themes.

Those historians who have used Port Books, and others who have not, have promoted particular views of their utility and interpretation. Hinton expressed the widespread ambiguity of feeling about the reliability of the Port Books by saying, they 'are now frequently consulted (if not entirely trusted)'[13]. Woodward, Jarvis and others have made the point that the Port Books are not statistical in character, by which they mean that the source does not record all the trade that existed. As Woodward has commented, '...the Port Books do not provide 'statistics' but only a record of a part of the trade passing through particular ports'[14]. The prime concerns of historians been issues of accuracy and interpretation concerning the geographical jurisdictions of the Customs ports and their effects on the omission of short-distance voyages, the use of different types of legal control of trade which could circumvent the Port Books, and the omission of certain kinds of goods. Other concerns have been the difficulties of interpreting concepts like 'merchant' and 'home' port in the records and the apparently imprecise descriptions of measures and commodities in use. Finally, many historians have been disturbed by the patchy survival of the records, and by the dangers to their integrity of smuggling and maladministration. These concerns are addressed in the following sections. The overwhelming problem of the huge bulk and intractability of the records, which has troubled many historians, is dealt with in Chapter 2.

ii. The system of administration

The system of keeping Port Books was instituted by an Exchequer Order of November 1564 to improve the collection of Customs duties at ports throughout England and Wales. Though other systems of recording sea-going trade had been established since the thirteenth century, and parchment books had been kept at each official port since

1428, this was the first time a systematic record had been kept of coastal trade[15]. The first books were issued on the new system from Easter 1565, and between this time and its abolition in 1799 books were kept for 25 Customs ports plus nearly a hundred creeks or lesser harbours which came under their jurisdiction[16]. Overseas Port Books recorded boats travelling between domestic and foreign ports, giving details of their movements and cargoes for the purposes of levying duties on imports and exports. Coastal Port Books were kept to check on boats travelling between English or Welsh ports, thereby preventing them carrying foreign trade and evading Customs duties.

The coastal Port Books were kept by Customs officials at each port, who received empty volumes from the Exchequer at regular intervals and returned them there to be checked against one another. In most cases the books each recorded inward and outward coastal traffic at a particular port for the six month periods before and after Christmas each year, though this varied between ports and over time. The system for controlling the coastal trade was complicated and remains to be studied in detail at a national level[17]. Contemporary instructions given to Customs officials are lacking, and it is clear that methods of keeping the books and recording trade varied from one port to another. This chapter presents an account of the system operated at Gloucester between c1640 and 1765.

The first matter of administration that must be tackled is the geographical jurisdiction of the port of Gloucester. Andrews has noted that significant problems can arise in the interpretation of Port Books if this is not understood[18]. 'Port' was a technical term, referring to a defined length of coastline. According to Crouch, '...by Ports is to be understood only those Places to which the Officers of the Customs are appropriated, and which contain and include all Privileges and Guidance of all the Members and Creeks therunto allotted'[19]. Member ports had a similar status, but were subject to the jurisdiction of the head port. According to Crouch, 'By Members is to be understood such Places where anciently a Custom-house hath been kept, and Officers or their Deputies attending, and are lawful Places of Exportation or Importation'. Overseas trade could only be carried from other quays by special 'sufferance' of the Customs House[20]. These other quays were recognised as 'creeks', by which 'is to be understood such Places where commonly Officers are or have been placed by way of Prevention or out of Duty or right of Attendance. And are not lawful Places of Exportation or Importation, without particular Licence or Sufferance from the Port or Member under which it is placed'[21].

According to Andrews, the main danger of not appreciating the boundaries of head ports and their relations to their members and creeks was that the trade of different

places could be confused. In some cases it was not clear that the trade of several creeks was included within a particular book, and Andrews cites the example of the considerable trade of Margate, all of which was recorded as though it were the trade of Faversham because it did not itself have the status of a port. Often the trade of different creeks was mixed indiscriminately in the books of the head port. To make matters worse, the topographical limits of ports might change, causing an apparent burst of activity or a decline as the trade of a creek was added or subtracted. In one case that Andrews noted the change was extremely misleading: although from 1685 the trade of the creeks of Folkestone and Hythe was recorded in the Dover Port Books, additional books continued to be produced for them as though they were still creeks of Chichester (with nothing recorded within their covers).[22]

An additional problem relating to the limits of ports, which Andrews did not identify, is that in some cases the traffic between Members of a port and the port itself, or between creeks within the same port, was not recorded. If trade did not leave the wider boundaries of a port, it seems it was not considered necessary to control it. This was certainly the case at Gloucester, the definition of whose boundaries therefore has a material effect on the conclusions that can be drawn from its Port Books.

The limits of ports were sometimes changed in response to the local development or decay of trade, rather as Parliamentary constituencies are re-drawn. In the eighteenth century, for instance, there were many complaints from shippers of lead at the Creek of Aberystwyth that they were forced to go to the Customs House at the Member port of Aberdovey to be issued with coquets[23]. As a result, the Customs House was eventually moved to Aberystwyth. The definition of ports was established by an Act of 1558[24] which restricted overseas trade to quays and places recognised by Exchequer Commissions. These designated the port boundaries, the member creeks within head ports, and the legal quays which could be used for overseas trade, the information being also recorded in the quarterly Establishment Registers of customs officers[25]. As Andrews points out, however, these sources were often in conflict or deficient, and the basic information for what was being recorded at the ports must be the internal evidence of the Port Books themselves[26].

In the case of Gloucester the boundaries of the head port included much of the estuary downstream toward Bristol and Chepstow. This is germane to the interpretation of the Gloucester Port Books, for traffic was only recorded which entered or cleared the official port, passing beyond its boundaries. In the early eighteenth century, the head port of Gloucester had no official members, and its creek was considered to be the whole of the River Severn from Bridgnorth to King Road[27] (the area between the mouths of the Bristol Avon and the Wye). The Royal Charter of 1580 which made

Gloucester officially a port was only slightly more specific in identifying its creeks, stating 'that the creeks of Gatcombe, Newnham, Barkeley, Tewkesburye, and all others from Welsherode shall be creeks pertaining to the said port'[28]. Both Bristol and Chepstow were outside the port of Gloucester: Chepstow was a member of the Port of Cardiff, and Bristol was a head port in its own right. Gloucester itself had been a member of the Port of Bristol until it achieved independence in 1581.

Although Gloucester is not recorded as having had any official members, the evidence is ambiguous. The Port did maintain Customs establishments at two creeks in the estuary, Newnham and Berkeley, at various times, and especially from about 1705 onwards. For most of the period studied, voyages by boats of ports like Newnham, Gatcombe, Woolaston, and Lydney in the estuary below Gloucester appeared in the Port Books despite the fact that they seem mainly to have operated directly from Newnham, not Gloucester. In the Port Book for 1666 a section was specifically headed 'From Newnham a Member of this Port', and this recorded about 30 voyages by boats of the adjacent estuarine creeks. In other years a similar number of voyages by such boats was recorded, but they were simply recorded among the Gloucester voyages. This may indicate that the Customs establishment at Newnham, which represented member status in 1666, was short-lived, and that afterwards boats had to go to Gloucester to get coquets, just as those from Aberystwyth had to go to Aberdovey. However there is evidence in the book for 1684 that a rider or other officer of the Customs was entitled to issue coquets at Newnham at that time, for a number of typical estuarine boats and cargoes were recorded in small groups out of the general date sequence of the book, suggesting that the details were collected at Newnham and returned periodically to be copied into the book at Gloucester.

After this, provision of an officer at Newnham may have stopped for a time, and boats from the estuarine ports were left to go without coquets, or 'let pass'. Whereas boats of estuarine home ports were recorded in 28 inwards or outwards entries in the books in 1666, 6 in 1674 and 15 in 1684, they were recorded in none in 1692, 1697, 1699 or 1704[29]. However, from 1705 the situation changed radically, with specific sections in each Gloucester Book now given over to Newnham or Berkeley. The boats of the same estuarine ports were now recorded 35 times in 1705, 26 in 1706, 18 in 1707, 25 in 1708, 7 in 1715 and 11 in 1722. It seems that an officers had been placed at Newnham and Berkeley, although these were still not necessarily regarded officially as 'member' ports. The sections typically were headed 'Port of Gloucester. Newnham Coast Entries Outwards'[30]. Nil entries were recorded often for Berkeley, but a separate section in the Gloucester books was still maintained for this information.

It is clear that in the early eighteenth century 'let passes' were still being issued

at Newnham alongside coquets, and these were not recorded in the Port Books. A stray document bound in with one Gloucester Port Book appears to be the notes of the Newnham officer for three months in 1718[31], which had been copied into the Gloucester book. The notes record a total of 28 inwards and outwards entries, but those which were marked 'let pass' were not subsequently copied into the Port Book; only nine out of the 28 were copied out, none of which were for 'let passes'[32]. These variations need to be borne in mind in any interpretation of the Port Books for Gloucester.

Traffic which did not pass out of the jurisdiction of the Port of Gloucester, including the estuary as far as the mouth of the Bristol Avon, was not recorded. Thus, traffic between the upper Severn and Newnham was omitted, as was traffic from Newnham to Berkeley, or, of course, between the upper parts of the river and Gloucester itself. In all the sample years studied there were no voyages recorded between Gloucester and any estuarine port above the Avon and Wye. An example of traffic omitted is the trade in iron between the Forest of Dean and places such as the Stour Valley and Coalbrookdale[33]. The Foley partnerships alone generated about 1,000 tons of pig iron a year sent upstream from the Forest of Dean to the Stour Valley c1700 and Johnson estimated that this was about half of the amount carried along the route. Most of this was shipped through Newnham, Gatcombe or Ashelworth[34], so that only the part which passed down the Wye to Chepstow and then upstream was recorded in the Gloucester Port Books. In 1705, this amounted to some 1,000 tons, perhaps half the traffic coming from the Forest of Dean as a whole.

Clearly, much traffic passed only along parts of the river above Gloucester and so could not be recorded in the Port Books. Boats might readily be found trading between, for example, Coalbrookdale and Evesham, without passing near Gloucester[35]. Iron is known to have passed from one works to another in the upper Severn region, for example the Lloyds of Dolobran forge in mid Wales received pig iron by the Severn from Coalbrookdale and Leighton in Shropshire as well as from Bristol in the early eighteenth century, and returned much of their bar iron to customers at Bewdley and the Stourbridge iron fair[36]. Lead smelted at Pool Quay near Welshpool was 'sent down the river' to customers at Broseley as well as Bristol in 1752[37]. Vast quantities of Shropshire coal were sold to communities along the river, but very little of this passed through Gloucester. Perry in 1758 said that over 100,000 tons of coal a year were shipped down the Severn, but the amount recorded as passing beyond Gloucester in the Port Books was only 44 tons in 1752 and 30 tons in 1765 (even in the busiest of 14 years from which coal shipments have been calculated from the Port Books the total was only 1,107 tons or 1% of Perry's figure)[38]. The same must have been true of a

proportion of many trades carried on along the Severn. Of the traffic which did not pass out of the bounds of the port, nothing is shown in the Port Books.

Even so, an enormous part of the traffic which passed along the Severn did go through Gloucester, mainly to or from the great metropolitan and commercial centre of Bristol. All the goods brought upstream from abroad, from south Wales and the west country passed through the port; and a significant part of many downstream trades must have been long-distance. Although coal was mostly sold above Gloucester, since the estuary had closer supplies, other trades were focussed upon Bristol. For example, the majority of Abraham Darby I's iron business from Coalbrookdale was with Bristol merchants, and passed through Gloucester. His account books indicate that on average about 60% of his trade by weight was with Bristol, and in 1709-10 over 80%[39]. Figures from the Port Books indicate that between a third and half of the salt produced at Droitwich in the early eighteenth century was sent to urban and fishery markets below Gloucester[40]. With so large and important an urban, industrial and trading centre as Bristol located a short distance below Gloucester, it was natural that large proportions of the mineral, agricultural and industrial production of the region should pass through and beyond the port. As far as upstream trade was concerned, the most traffic must have been in goods from outside the Port of Gloucester, such as imports from Bristol or industrial goods from Bristol and other regions. Upstream shipments originating at Gloucester or above would have been limited to agricultural produce. woollens, and a few craft products. Since Gloucester had a negligible overseas trade of its own, imported goods for the Severn valley came upstream from Bristol or Chepstow. Indeed, with the exception of iron and other goods from the Forest of Dean, and negligible quantities of produce from the eastern bank of the estuary, all upstream trade from below Gloucester would have passed through the bounds of the port.

Although the wide extent of the Port of Gloucester had important implications for recording, a substantial and important trade was carried on through the port and out the other side. Thus, all riverborne imported goods to the Severn valley were liable to recording; and a substantial part of the downstream traffic of the Severn (with the exception of coal) also passed through the port. Andrews' strictures on the boundaries of ports are important in preventing misunderstandings of the trade recorded. The trade of the creeks of Newnham and Berkeley is sometimes recorded within the books for Gloucester and sometimes not, and it may be identified only by inference. The most important implication of the bounds of Gloucester, however, is one not identified by Andrews: namely that traffic moving within the bounds of the port was not recorded. If this is not appreciated, the trade of the Severn through Gloucester, and especially the iron trade, may be grossly misrepresented.

Having examined the geographical aspects of the creation of the Port Books, it is important to describe who collected the information and by what methods they worked. The establishment of Customs officers was not the same at all ports. The continuity and numbers of officers stationed at creeks and ports varied, a port like London naturally having a larger number of officers and a greater complexity of methods than a relatively small river port like Gloucester. At most ports the Customer was the chief financial officer, responsible for keeping records and collecting Customs. The Controller may have deputised as the actual keeper of the records, and had joint control of the Customs seal. The Searcher was responsible for checking the goods carried, and there might be a variety of tide waiters, clerks, deputies and other officers with diverse duties. Finally, the Surveyor was responsible for supervising all other port officials[41].

Based at Gloucester were a Customer and a Controller, and junior officers and clerks. They worked from the Customs House, immediately adjacent to the quay in Gloucester, which had been erected in 1580/1 and had the Queen's Arms painted on it[42]. It is not clear to what extent other officers were posted farther afield. Certainly, it seems that a separate officer was stationed part of the time at Newnham[43]. Others may have been sent to other places not to issue coquets but to watch for illegal trade, for example on the branch of river that by-passed the town quay through Maisemore, one and a half miles from the Customs House. The coastal Port Books appear to have been written by the Controller, who signed them at the end[44]. The books were also signed by the Customer, or chief officer of the Port[45]. The records kept at Newnham were prepared by someone who styled himself Customer and Collector there, but were then copied into the main book in the same hand as the rest[46].

Vessels setting out on coastal voyages submitted to the inspection by Customs officers who wrote a description of their contents in the section of the current coastal Port Book which dealt with outward trade. At the same time, the merchant responsible for the vessel paid a bond or gave other security to guarantee his cargo would be taken to the avowed destination. The master of the vessel was then issued with a 'coquet' (or 'cocket') which documented the authorised cargo and which he carried with him to his destination. Fees paid for the issuing of coquets and certificates were stated in the 1580s to have been 5s 8d at Gloucester (whereas, it was said, they had only been 2s 8d a few years earlier when the Customs House at Bristol was responsible)[47]. Crouch in 1725 enumerated a large number of fees to be paid for such services, including, 'for every Coast Coquet Outwards, and entering His Majesty's Books for a whole Ship or Vessel passing in the open Sea', 1s for the Collector, 8d for the Controller, 8d for the Surveyor, and 8d for the Surveyor General[48]. It is clear that organising such paperwork could be an expensive business for the merchant, apart from the cost of

paying over the bond itself. The amount of the bonds paid is uncertain. At some ports and for very valuable cargoes, the bond could be several hundred pounds, or it could be just a few pounds where there was less danger of illegal export, and for some goods and journeys bonds were not considered necessary[49]. No evidence has yet come to light of large bonds being paid by merchants at Gloucester, and it is possible that the regularity of the trade and familiarity of the merchants was such that they were thought unnecessary.

On arrival at its destination, the vessel would again submit to Customs officers who checked the cargo and wrote a description of it, this time in the inwards section of their own coastal Port Book. Each port therefore had a record of both inward and outward voyages. The penalty for failing to report on arrival was a fine upon the master of £100, or if the goods were landed before delivery of the coquet to the Customs officers the master forfeited the whole cargo and an additional sum equivalent to its value[50]. If the description made at the port of arrival matched that written on the coquet carried by the master, the officers would 'certificate' or endorse the coquet, and would write in the margin of their entry in the Port Book 'Ret' or 'Gr' to indicate that a return had been granted[51]. This, too, incurred fees at the Customs house according to Crouch, 'for making every Certificate of Return', of 1s for the Controller, and 2d each for the Surveyor, Comptroller and Surveyor General[52].

On return to the original port of departure, the certificate was submitted as proof that the cargo had not been carried abroad, and the bond, if there was one, could be retrieved. If a certificate was not submitted, then the bond would be forfeited[53]. For most of the period studied, the outward sections of the Gloucester Port Books have marks in the margin next to each entry stating 'Cert.' to indicate that a certificate had been received. The certificate had to be returned within six months of the goods having been landed, so that checks could be carried out accurately on the return of books to the Exchequer[54]. Once again, a fee was charged, this time of 4d to the Comptroller only, 'for discharging the same Bond and filing the Certificate to the Bond'[55].

This complicated system was designed to ensure a constant cross-checking of coastal trade between the ports of departure and arrival. For most return voyages, the system was effectively working in two ways simultaneously, for the vessel would normally be returning with a new cargo, and so would be carrying both a new coquet and a certificate issued at its initial destination for the earlier coquet.

As has been seen, punishments for evasion were considerable, in order to counter the obvious temptation for merchants and masters of submitting to the procedures. The Customs Officers also had powers to stop vessels that attempted to evade inspection. There is no direct evidence as to the ways in which these were

exercised at Gloucester, but Defoe gives an account of interception at Gravesend of vessels leaving London, where 'a searcher of the customs comes on board, looks over all the coquets or entries of the cargo, and may, if he pleases, rummage the whole loading, to see if there are no more goods than are enter'd'. The ships were called in to anchor at Gravesend by a sentinel firing a musket; and if the ship did not stop a warning canon was fired. If that too was ignored, another canon was fired, which was the signal for Tilbury Fort to open heavy fire on the vessel. Defoe knew of vessels which had got through, but said that evasions were difficult and rare, '...even the empty colliers and coasters go on shore, and give an account who they are, and take a signal from the customs house office, and pay six-pence, and then pass on.'[56]

At some ports, other systems than that described, whose prime Customs document was not the coquet but the 'transire' (deriving from the Latin *transire permittatis*[57], the 'let pass', the 'warrant' or the 'sufferance', permitted goods to be carried without bonds being paid. It is likely that many of these words coincided in meaning, especially 'warrant', 'transire' and 'let pass'. The circumstances of their use seem to have been when destinations were close or goods were of low value and the danger of export was slight, but no contemporary explanation of this has been found by any scholar[58]. Gras suggested that transires were given for English wares (as opposed to raw materials) or 'for imported goods which were practically certain to be unloaded at another English port'[59]. In these cases, the cargo was still inspected and fees were still paid to the Customs officers, but goods were not necessarily recorded in the Port Books[60]. Whether or not they were recorded seems to have been consistent at least through individual Port Books, as shown by Andrews for the Kentish books[61].

In the Gloucester series, the vast majority of the books are explicit that each entry was 'per cocket dated...'. This could mean that let passes and transires were seldom issued at Gloucester or that they were simply not recorded in the Port Books. It seems likely that let passes or their equivalents, apart from a few rare instances in the seventeenth century[62], were not issued at Gloucester before the mid 1720s, when there was a sudden decline in the thoroughness of recording. The main evidence concerns comparison of the Gloucester books for 1699 with those for Bridgwater, where let passes were copied out in the same way as coquets. In this year, the Gloucester Port Books recorded 21 coquets for Bridgwater, whilst the Bridgwater books recorded a consistent number of 24 from Gloucester, of which none were by let pass. (The discrepancy is explained by the fact that one voyage began before Christmas but arrived after it, and two were supposedly setting out for Minehead not Bridgwater.)[63] The insubstantial role of let passes at Gloucester is also indicated by the consistency of recorded trade with other evidence for trade volumes discussed below[64].

However some let passes did affect Gloucester before the 1720s, owing to the fact that they were issued at other ports. It is likely that the inward traffic in the Gloucester Port Books is an underestimate because vessels let pass from their ports of departure were not then recorded at Gloucester. Comparison of the Bridgwater and Gloucester books for 1699 for inward traffic shows that 11 coquets and 7 let passes were issued for Gloucester from Bridgwater, but only the 11 coquets appear in the Gloucester inwards pages[65]. The voyages covered by let pass did not have cargoes of high value, but they were nevertheless diverse and quite large, containing commodities such as iron goods, wine, oats, and beans. Since Bristol, the major port communicating with Gloucester, did not record let passes at all, it is not possible to check whether they were issued there, and the extent to which such omissions affected the total trade recorded at Gloucester. However, since the cargoes brought upstream from Bristol were usually of high value, and almost always included tobacco and other goods with high duties, it seems likely that let passes would have been issued much less frequently.

Let passes issued at Newnham also affected the trade recorded in the Gloucester Port Books. The stray notes of the Newnham Customs officer which have already been mentioned contain 20 outward and 8 inward entries for a three month period, compared with only 6 outward and 3 inward transcribed into the main Port Book. All of the omitted entries were marked 'let pass'[66]. Again, a variety of cargoes was included, but they were generally small and of low value. The result is that the trade of Newnham cannot be studied so effectively as can the trade of Gloucester itself. The same probably applies to Berkeley, where the Customs officer usually entered nil returns.

A further variant in the system of recording was that items which had been imported before being carried coastally were sometimes given 'certificates' that duty had been paid on them[67]. These goods appear to have been recorded in the coastal books as standard procedure in the Gloucester series, and therefore do not affect the quality of the records. The upstream trade contained a high proportion of goods which had been imported, and occasionally whole cargoes of the same. The Port Books for Gloucester seldom included mention of a certificate or other assurance that duty had been paid, and seem to have done so only where the route involved was unexpected and therefore suspicious. For example in 1705, entries state that duty has been paid on Scotch linen coming downstream, on coal coming from Bideford to Gloucester, and on Irish tallow imported at Newnham and taken on to Bristol[68].

There was a rapid decline in the levels of recording carried out for the Gloucester books from the 1720s. This may have been caused by the use of both let passes and sufferances at the Gloucester Custom house. Study of almost any aspect of the trade

recorded shows a sudden decline after about 1725. This is apparent in all the succeeding chapters which deal with the examination of trade. The number of voyages recorded per year fell from 6-700 in 1708, 1715 and 1722 to 3-400 in 1733, 1741/2 and 1752, and to only 237 in 1765. This suddenness makes it clear that the cause of decline was a change of recording methods in 1725. In this year, the number of entries fell rapidly and, for the first time, the home ports of boats were not given in each entry. Some goods also seem to have been omitted from cargo descriptions, and replaced with comments like 'iron by sufferance', or 'one sufferance annexed'[69]. A similar decline occurred in Port Books around the coasts, and this was mistakenly interpreted by Willan as a decline of trade in the mid eighteenth century[70]. The decline in recording at Bristol of voyages to Gloucester was particularly dramatic, with the numbers falling from 232 in 1699 to only 34 in 1738[71]. This must have reflected the regularity and relative safety in revenue terms of the Severn trade, as it was quite out of proportion with the decline of recording as a whole at Bristol.

The extent of the decline at Gloucester also seems to have varied according to the factors of risk engendered by not recording voyages. Whereas recorded voyages into Gloucester from 1722 to 1733 fell from 271 to 70 overall (nearly 75%), outward voyages recorded fell only from 407 to 285 (30%). This reflects the fact that the majority of upstream voyages would have been largely with goods already certified as having paid import duties or unlikely to be exported. Upstream voyages from Bristol and from Chepstow, as the nearest ports, were the least likely to present problems as the trade with them was regular and dominated by river craft, and these were subject to a worse decline in recording than voyages from more distant ports. Recorded upstream voyages from Bristol fell by 76% between 1722 and 1733 and those from Chepstow by 96%, whereas those from south and south west Wales fell by only 32% and those from Somerset, Devon and Cornwall increased slightly. It is possible that the lesser decline of the further ports actually represented an increase in voyages which compensated for the decline in recording, but this is unlikely in the context of the stability of voyage numbers in earlier and later years. The downstream voyages from Gloucester, whilst they did not fall so far, also varied in decline from destination to destination. Compared with the overall decline between 1722 and 1733 of 30%, recorded voyages to both Bristol and Chepstow fell by 40%, but those to south and south west Wales fell by only 30% and those to Somerset, Devon and Cornwall, again, grew slightly. In both upstream and downstream trade, recording seems to have fallen off terminally in all categories in the final year of the records, 1765.

These patterns of decline in recording must partly have been created by the fact that some commodities were recorded more carefully than others. The total number of

commodities recorded twice or more per year in the Gloucester Port Books fell from 270 in 1722 to only 107 in 1752. The difficulties of studying some trades are extreme, particularly those which were upstream in direction. For example, upstream voyages carrying wire fell from 14 in 1715 and 24 in 1722 to only 2 each in 1733, 1741/2, 1752 and 1765, making a quantitative study of that commodity impossible[72]. This shows that the decline in recording took the form of sufferances on particular items of cargo as well as let passes for voyages, as the rate of decline is much higher than that for voyages as a whole. This can be illustrated in volumetric terms as well as numbers of voyages. The recorded tobacco trade fell from a total upstream quantity of over 800,000 lbs in 1722 to 48,000 lbs in 1733 (a 94% fall compared with a 76% fall in numbers of upstream voyages from Bristol) and continued to decline steadily. Clay tobacco pipes shipped downstream fell in quantity in a similar way. Over 3,000 gross were carried downstream in 1722, but less than 600 were recorded in 1733 and only three boxes by 1752. On the other hand, the salt trade was an example of continuing recording in detail, presumably because salt was liable to domestic duties. From a total in 1722 of 168,073 bushels sent downstream through Gloucester, the recorded figure rose to 297,588 in 1733 and then remained stable at the slightly lower level of about 242,000 bushels in 1741/2 and 1752. However it, too, declined rapidly in 1765, to 74,000 bushels. In addition to salt, only about eight commodities seem to have maintained a high level of recording, although it is uncertain without detailed research on each whether a decline in recording was masked by an increase in trade. Many of these commodities were ones in which there was a stronger than usual governmental interest. The numbers of recorded voyages with wool rose from 48 to 61 between 1722 and 1752, pot clay from 80 to 87, nails from 2 to 26, and bricks from 19 to 20. Some other commodities remained reasonably stable: voyages with British spirits fell only from 90 in 1722 to 72 in 1752, coal from 46 to 31, hops from 108 to 96, and wheat and wheatflour from 70 to 54.

Whilst the Port Books for Gloucester after 1725 have a much reduced quantitative value, they can still be used illustratively to suggest that activities were taking place, and it seems they can be used quantitively for restricted subjects less affected by the decline, for example trade with more distant ports and trade in certain commodities, including salt, wool, pot clay and coal.

iii. Format and interpretation

Each Port Book was a stitched volume of parchment or vellum, consisting of between four and about 700 folios, depending upon the amount of traffic it was required to

record. Those for Gloucester were usually between five and 40 folios in length. In most cases, separate books were kept for each major or 'head' port and each of the lesser harbours which came under its jurisdiction, but in others, like Gloucester, the book for a head port was divided into sections for the port and each of its harbours and creeks, or else had entries for he creeks intermingled as described above.

Each entry described a voyage in or out of the port. The full range of information given in the descriptions and its arrangement varied over time, but a core of information remained common to all books. Typically, an entry included the date on which a coquet was issued for a voyage, the destination, the name of the boat and its 'home' port, the names of the master and of the merchant (sometimes referred to as 'Ind' for indenturer) responsible for the coquet, and the cargo being carried. The cargo is described in detail, with a wide variety of terms and measures. Other information is sometimes included in particular books. Most pre-Civil War books, for instance, gave the tonnage capacity of the boat, and often the date of the retrieval of the bond by the merchant. Some also gave the names of people other than the principal merchant, probably owners of goods or boat owners in different cases, who took a joint responsibility in providing the bond[73]. However, these classes of information were not given in the period under study here. A typical outward entry in the Gloucester Port Books, for a vessel sailing from Gloucester to Bristol, reads as follows:

Bristol Prosperity of Bewdley Jno Beale Ind Tho: Steward Mr 20 tons Iron & Ironware 20 tons Pott Clay 2000 Brick 20 pa & trusses Manchr goods & thread 4 pa & trusses Kiddmr Stuff 2 pa 1 hhd wt & 10 Cwt
Cert tand Leather 1 ton red Lead 60 Reams paper 2 boxes Candles 6 Doz: bags 10 Cwt timber & timbr Stuff 5 Cwt Houshold goods & Wearing Aparll Coqt Dat 23d Do -

It is necessary to explore some of the underlying concepts within such entries if they are to be interpreted correctly. The interpretation of concepts such as the date of entries and the role of the master of the vessel need not be considered at length here, since their understanding is not critical to the uses of the data proposed. In brief, the date stated for most of the Gloucester Port Books series was the date on which the coquet was issued. This was the case even in inward entries, so that entries in the inward sections of the books were usually not in a precise order following the dates, since vessels took varying amounts of time to get to Gloucester from the places where coquets were issued. From the 1730s, the coquet date was abandoned in inward entries in the Gloucester books, however, and a 'date arrived' was given instead. In the earliest

books, up to the 1660s, a second date was sometimes given, the interpretation of which is more uncertain, but that does not concern this study[74]. It is clear from the records that the master of the vessel was the person in charge of it during its journey, and who actually accompanied it. Masters were never reported to be participating in simultaneous voyages, unlike merchants, who might be named for several vessels at the same time, each with a different master. In some cases, however, the master and merchant were the same person.

The concept most requiring interpretation for this study is that of the 'home' port of a boat, which was expressed in phrases such as '*Prosperity* of Bewdley' or '*John* of Salop'. Several meanings of the association of boat and port can be postulated. It might have referred to the registration of a boat at a particular port, but this can be discounted as no formal system of registration affected coastal vessels until 1786[75]. More likely meanings are that it referred to the place in which a merchant lived or in which a vessel's owner lived, from which a boat habitually traded, or from which a boat departed on its outward journey. For other ports and periods, several scholars have made different interpretations of the 'home' port. Woodward, whose main experience was with sixteenth century books, suggested it was the home town of the merchant[76]. Hinton pointed out that 'the designation would have no purpose if it did not denote the place where the ship was most usually to be found when not at sea' and also favoured the place where the merchant lived[77]. Willan favoured the place with which a vessels usually traded, and suggested that the Act of 1786 merely consolidated previous thinking by stating 'the Port to which any Ship or Vessel shall hereafter be deemed and taken to belong, within the Intent and Meaning of this Act, shall be, and is hereby declared to be, the Port from which and to which such Vessel shall usually trade... and at or near which the Husband, or acting and managing Owner or Owners of such Ship or Vessel usually resides or reside.'[78] Wanklyn has investigated these arguments with respect to the Gloucester Port Books and concluded that the home port was the place from which a vessel set out on its downriver voyage[79].

Three types of evidence can help. These concern the successive voyages of particular boats, the commodities carried, and information about particular merchants. There is clear evidence in the Gloucester Port Books that the home port of the vessel was not the place of residence of the merchant. A survey of all the downstream entries in the Gloucester books for five years between 1704 and 1708 records 148 individual merchants, most of whom operated fairly regularly with the same boats and from the same ports. However 19 of these 148 (or 13%) were merchants for voyages from more than one 'home port' during the five years, showing that the home port could not have

been regarded as the place where they resided. For example, Thomas Jacksons was merchant for 22 voyages by boats of Brockweir on the Wye, 25 by boats of Bridgnorth, and one by a boat of Worcester. Another example was Richard Lewis, who was merchant for one voyage by the *George and Anne* of Benthall, and others in the period by vessels of Gloucester. Richard and John Farley, who were merchants for many voyages by the *John* of Shrewsbury from 1686 to 1705 are known from the Shrewsbury burgess roll to have lived several miles downstream at Atcham[80].

The evidence for the successive voyages of individual boats shows that boats, too, could be said to be 'of' more than one port. Jacksons, for example, used in his journeys between 1704 and 1708 boats including the *Providence*, the *Hereford* and the *Thomas*, all of which were said to be of both Bridgnorth and of Brockweir at different times. Other boats, too, can be identified as having been said to belong to more than one port in the period. The *Royal Oak*, for example, was operated by members of the Oakes family during these five years from Bridgnorth, Tewkesbury and Worcester. The *Gartridge* was sailed on different voyages by William Perkes under the titles 'of Broseley' and 'of Worcester'. Many examples can be identified of boats alternating ports in this way[81].

One of the reasons that it is important to establish the meaning of the 'home' port is that it may provide evidence of the extent of the voyages above Gloucester which, unlike voyages to other Customs ports below it, are not recorded explicitly. This is particularly important for the understanding of trade in individual commodities. However the trade in some commodities can shed light on the problem, as there is independent information about where they were produced or consumed. By examining the trade in these goods it is possible to glean further evidence both for the meaning of the 'home' port and for the nature of transshipment on the river.

One of the best cargoes for diagnosing information of this sort is pot clay. This was fire clay produced in the area around Stourbridge, and gained its name from the fact that it was used for making crucibles or 'pots' for the glass industry; it was not common clay available much for widely for making domestic pottery[82]. Analysis of the numbers of voyages with pot clay in successive years shows that it was almost invariably carried on boats of Bewdley, the port nearest to the source of the commodity. In the five years 1704-8, 197 voyages were recorded carrying pot clay downstream of which only 4 were from ports other than Bewdley (two from Worcester, and two from Redbrook on the Wye where the clay would have been used). This commodity, then, was almost always carried by boats said to be of the home port at one end or other of its journey, and provides strong evidence that the 'home port' was the place from which the loaded vessel set off. There is no evidence of vessels collecting pot clay on the

journey from further upstream, though the Worcester boats involved may have either received the commodity transshipped or gone upstream to collect it.

Another cargo which can be used in this way is glass. During the period 1704-8 there is evidence for this having been made at Stourbridge, Gloucester and Newnham[83]. In these five years, the Port Books record 360 downstream voyages with glass or glassware, of which all but 23 were from know glassmaking centres, and the vast majority were from Bewdley. Again, there is an overwhelming correlation between the stated 'home' port and the place from which the goods must have come. The other ports involved were Worcester, Upton and Tewkesbury (which may have taken transshipped goods to places not normally reached by Bewdley boats), ports in the Bristol Channel, and in two cases Shropshire ports, from which the boats may on these rare occasions have collected the goods on their way downstream.

It is more difficult to find a commodity carried upstream which had a narrowly defined place of consumption. One of these is kelp, used in the glass industry as a source of sodium. In the same five year period, 45 voyages brought Kelp upstream, of which 39 were by boats of Bewdley or Gloucester near which glassworks operated. The remainder were one or two voyages each by boats from Tewkesbury, Bridgnorth, Evesham, Worcester and Shrewsbury. This suggests that there was a strong correlation between the place where a commodity was to be consumed and the home port of the boat which carried it; although there were also cases of goods presumably being carried by boats that were passing through.

It is clear for this period and for the Gloucester Port Books that there was a powerful association between the home port of the boat making any journey and the place where its goods were produced or consumed. This suggests that the 'home port' was usually the place from which a vessel set off on its outward journey, whether or not this was the prime factor in its designation as such. For most journeys, all possible definitions of 'home' port would agree. This does not necessarily mean that all the cargo originated at or near the home port; transshipment from short-distance vessels onto ones going on down river was frequent. However, few boats seem to have collected items once they had begun their journey[84]. Thus an entry in the Port Books usually means a cargo came from no further downstream than the given port. On return journeys, the cargo was probably destined for a place no further downstream than the vessel's 'home'[85].

The home port was no longer stated in the Gloucester series after about 1725. This may reflect the fact that more transshipment was taking place and that the designation of a place of departure for a voyage was increasingly fraught.

The people described as 'Merchants' or 'Indenturers' in the Gloucester Port Books of this period were of many sorts, and the concept of the 'merchant' is not critical to analysis within this thesis. A merchant might be the owner of the cargo, the person paying the bond, or the owner of the vessel. Studies of the Gloucester books suggest that all of these might commonly be the case, but that the essential requirement was that the merchant should be 'responsible' for the cargo and able to stand bond. Some were traders in the conventional sense, such as Graffin Prankard, who was named as a merchant in the Port Books for cargoes of salt and was a proprietor at Droitwich as well as a buyer and seller of salt on a large scale. He was recorded as the merchant in the Port Books at times when he both did and did not own the boat concerned[86]. Industrialists such as John Hanbury of Pontypool and the Duke of Beaufort also appeared occasionally as merchants, though they did not own the boats concerned, and more goods were often carried than those in which they are likely to have had an interest. Most merchants, however, seem to have been carriers who delivered goods for others, such as Thomas Williams, George Bradley and Edward Owen who were paid freight by Abraham Darby to carry his iron and other goods to and from Bristol[87], or the Beale family who operated a regular packet services to carry general goods from Bewdley to Bristol and Bridgwater. Both Darby's carriers and the Beales might also trade in their own goods from time to time and would rarely charter a vessel for one person's sole use. In an Exchequer deposition for a case against John Beale, witnesses stated that he '...generally carried upon hire for Merchants and Tradesmen who pay him for the freight and Carriage thereof', but that '...he doth often times Carry Some goods as kelp for makeing Glass of his own proper goods'[88]. It was merchants such as these who made the most frequent journeys and were responsible for by far the largest share of the voyages recorded in the Port Books. Probate inventories show that many such people, described in the Port Books as merchants, owned boats or shares in them[89]. None of this mattered as far as the Customs Officers were concerned, so long as merchants were responsible for the cargo and stood for a bond to assure compliance with the regulations.

Uncertainties exist also over the interpretation of items of cargo and weights and measures. Terms such as 'Manchester ware' or 'household goods' may seem straightforward, but their exact usage by the Customs officials is unclear. Did they refer generically to all things from Manchester or to all things that might be part of a household, or were they more specific? Terms were often not used consistently over time. Generally, the Customers were more precise when entering the unfamiliar. The early journeys carrying goods from Abraham Darby I's works at Coalbrookdale, for

example, were carefully entered and phrases like 'iron pots' or 'cast ware' used until about 1715. Only after this, with increasing familiarity, did vague phrases like 'iron and iron wares' became more common. Interpretation of this phrase can only be judged from the context of individual entries. Unspecified 'iron ware' could be quantified in hogsheads, bundles or tons. More detailed entries suggest that hogsheads were used for small items like nails while the bundles were of things like shovels and frying pans. Pig iron, pots and other cast ware were apparently loaded loose and quantified by weight. These distinctions therefore provide some ways of interpreting the hidden differences between more generic terms[90].

Another difficulty in examining commodities is deciding which terms were synonymous for most purposes. For example an examination of the brick trade needs to be informed by the variety of terms for bricks that were given in the Port Books, which included 'bricks', 'clay bricks', 'white bricks', 'white Stourbridge bricks', 'pot clay and bricks', 'small bricks', 'large bricks', and 'square bricks'. Decisions need to be made on their merits for any individual study which goods should be selected and which rejected as a different commodity. More obstructive problems arise where particular commodities may have been included within broad categories in some cases and recorded separately in others. Care needs to be taken to ensure that a proportion of trade is not lost within broader terms by examining the patterns of trade which appear. In the case of sugar, for example, the appearance of the term itself is sporadic and irregular, suggesting strongly that it was often hidden within terms such as 'grocery' or perhaps even 'confectionery'. 'Sugar' often appears in phrases such as 'sugar and grocery'. Tobacco, on the other hand, can be shown to appear as a separate item in a very high proportion of upstream voyages, and never appears in compound phrases in the same way that sugar does, suggesting that it was not normally hidden amongst more general consignments of grocery.

Some of the measures used to describe the cargoes are almost undefinable in modern terms, such as the 'pack', the 'truss' or the 'box'. Many of the measures which seem straightforward in definition also present problems, such as the 'hogshead', which varied in size according to the particular commodity it contained, and may not always have been full, or the 'wey' which varied considerably in size from one place to another and over time. These present particular difficulties for researchers concerned to quantify trade. However, with the aid of books of Rates which described duties levied on goods and the measures of them to be used, other contemporary sources, and Zupko's **Dictionary of Weights and Measures**, it is possible in most cases to derive an approximate equivalent, though a margin of error has to be accepted. If conversions are calculated or estimated to the most common unit of measure in use for any particular

commodity, the margins of error can be minimised. Examples of such conversions being undertaken successfully are given in detailed studies below of the salt and tobacco trades[91].

iv. The integrity of the Port Books

One criticism levelled at Port Books nationally by Clark, Woodward and others has been that they form a far from complete series[92]. Woodward calculated that less than a fifth of London's books survive between 1565 and 1697; and those after 1697 were destroyed at the end of the nineteenth century. Other series were not compiled during the whole period 1565 to 1799. Some, like Gloucester's, were started after the initiation of the system: Gloucester was made a Customs port in 1580; and several were terminated before the end of the eighteenth century. Gloucester's stopped in 1765, Plymouth's in 1758, Yarmouth's in 1780, Hull's in 1787 and Chester's in 1789. Nevertheless, it should be emphasised that at least 8,000 coastal Port Books exist, and the coverage is very good of the period when the records appear to be at their most authoritative between about 1680 and 1720. There is usually at least one full year per decade, and many periods of several years for which the records are continuous. Few other series of trade records can compare with the Port Books in length or completeness.

The extant coastal Port Books for Gloucester in the period under study are shown in Table 1.1. The records are extremely sparse in the mid seventeenth century, with only five available for consultation between 1637 and 1674. This paucity certainly causes some problems over the interpretation of the records, but it is still possible to find one complete sample year per decade. After this, more of the books survive during the 1670s, and more again in the 1680s and 1690s, although the series is still not continuous. The best period of survival coincides with that for which the quality of recording seems to have been greatest, between about 1690 and about 1725. During these 35 years, 55 coastal Port Books exist for Gloucester, representing an 80% survival rate. The gaps are dispersed such that the longest complete run is for five and a half years, between 1703 and 1708. After 1725, when the records began to decline in quality, there is a good rate of survival until the mid 1730s, followed by a large gap with few books until the early 1750s, after which a large number of books survive up to the end of the series in 1765.

Many historians have been worried, with more justification, about the completeness of the records contained in the Port Books which do survive. Enough has been said

Table 1.1

Extant Coastal Port Books for the Port of Gloucester, 1636 - 1765

Dates of books	Piece if extant
12/1636 - 12/1637	E190/1248/10
12/1638 - 12/1639	
12/1639 - 12/1640	
12/1640 - 12/1641	
12/1641 - 12/1642	
12/1642 - 12/1643	
12/1643 - 12/1644	
12/1644 - 12/1645	
12/1645 - 12/1646	
12/1646 - 12/1647	E190/1248/14
12/1647 - 12/1648	
12/1648 - 12/1649	
12/1649 - 12/1650	
12/1650 - 12/1651	
12/1651 - 12/1652	
12/1652 - 12/1653	
12/1653 - 12/1654	
12/1654 - 6/1655	E190/1249/01 Unfit
6/1655 - 12/1655	
12/1655 - 3/1656	
3/1656 - 9/1657	E190/1249/02
9/1657 - 12/1657	
12/1657 - 12/1658	
12/1658 - 12/1659	
12/1659 - 12/1660	
12/1660 - 12/1661	
12/1661 - 12/1662	
12/1662 - 12/1663	
12/1663 - 12/1664	
12/1664 - 12/1665	
12/1665 - 12/1666	E190/1249/04
12/1666 - 12/1667	
12/1667 - 12/1668	
12/1668 - 12/1669	
12/1669 - 12/1670	
12/1670 - 12/1671	
12/1671 - 12/1672	
12/1672 - 12/1673	E190/1249/09
12/1673 - 12/1674	E190/1249/10
12/1674 - 12/1675	E190/1249/12
12/1675 - 12/1676	
12/1676 - 12/1677	
12/1677 - 12/1678	
12/1678 - 12/1679	E190/1250/04
12/1679 - 12/1680	E190/1250/05
12/1680 - 12/1681	E190/1250/08
12/1681 - 12/1682	E190/1250/09
12/1682 - 12/1683	E190/1251/02
12/1683 - 12/1684	E190/1251/01
12/1684 - 6/1685	E190/1251/04
6/1685 - 12/1685	E190/1251/04
12/1685 - 6/1686	E190/1251/07
6/1686 - 12/1686	E190/1251/12
12/1686 - 12/1687	
12/1687 - 12/1688	
12/1688 - 12/1689	E190/1251/14
12/1689 - 12/1690	
12/1690 - 12/1691	E190/1251/15
12/1691 - 6/1692	E190/1252/02
6/1692 - 12/1692	E190/1252/01
12/1692 - 6/1693	
6/1693 - 12/1693	E190/1252/03
12/1693 - 6/1694	
6/1694 - 12/1694	E190/1252/06
12/1694 - 6/1695	E190/1252/07
6/1695 - 12/1695	E190/1252/08
12/1695 - 6/1696	E190/1252/09
6/1696 - 12/1696	E190/1252/14
12/1696 - 6/1697	E190/1252/17
6/1697 - 12/1697	E190/1253/03
12/1697 - 6/1698	E190/1253/05
6/1698 - 12/1698	
12/1698 - 6/1699	E190/1253/06
6/1699 - 12/1699	E190/1253/09
12/1699 - 6/1700	
6/1700 - 12/1700	E190/1253/12
12/1700 - 6/1701	E190/1253/14
6/1701 - 12/1701	E190/1254/01
12/1701 - 6/1702	
6/1702 - 12/1702	
12/1702 - 6/1703	
6/1703 - 12/1703	E190/1254/05
12/1703 - 6/1704	E190/1254/07
6/1704 - 12/1704	E190/1254/09
12/1704 - 6/1705	E190/1254/10
6/1705 - 12/1705	E190/1255/05
12/1705 - 6/1706	E190/1255/01
6/1706 - 12/1706	E190/1255/07
12/1706 - 6/1707	E190/1255/08
6/1707 - 12/1707	E190/1255/14
12/1707 - 6/1708	E190/1255/11
6/1708 - 12/1708	E190/1256/01
12/1708 - 6/1709	
6/1709 - 12/1709	E190/1256/05
12/1709 - 6/1710	E190/1256/06
6/1710 - 12/1710	E190/1256/08
12/1710 - 6/1711	E190/1256/11
6/1711 - 12/1711	E190/1257/03
12/1711 - 6/1712	E190/1257/05
6/1712 - 12/1712	E190/1257/08
12/1712 - 6/1713	E190/1257/07
6/1713 - 12/1713	E190/1257/12
12/1713 - 6/1714	E190/1257/11
6/1714 - 12/1714	
12/1714 - 6/1715	E190/1258/04
6/1715 - 12/1715	E190/1258/05
12/1715 - 6/1716	E190/1258/06
6/1716 - 12/1716	
12/1716 - 6/1717	
6/1717 - 12/1717	E190/1258/13
12/1717 - 6/1718	E190/1258/17
6/1718 - 12/1718	E190/1259/01
12/1718 - 6/1719	E190/1259/02
6/1719 - 12/1719	
12/1719 - 6/1720	E190/1259/07
6/1720 - 12/1720	E190/1259/09
12/1720 - 6/1721	
6/1721 - 12/1721	
12/1721 - 6/1722	E190/1259/10
6/1722 - 12/1722	E190/1260/04
12/1722 - 6/1723	
6/1723 - 12/1723	E190/1260/06
12/1723 - 6/1724	E190/1260/11
6/1724 - 12/1724	E190/1260/09
12/1724 - 6/1725	E190/1260/07
6/1725 - 12/1725	E190/1261/01
12/1725 - 6/1726	E190/1261/06
6/1726 - 12/1726	
12/1726 - 6/1727	E190/1261/07
6/1727 - 12/1727	E190/1261/12
12/1727 - 6/1728	E190/1261/10
6/1728 - 12/1728	E190/1262/05
12/1728 - 6/1729	E190/1262/01
6/1729 - 12/1729	
6/1730 - 12/1730	
12/1730 - 6/1731	E190/1262/11
6/1731 - 12/1731	E190/1263/06
12/1731 - 6/1732	E190/1263/05
6/1732 - 12/1732	E190/1263/08
12/1732 - 6/1733	E190/1263/10
6/1733 - 12/1733	E190/1263/12
12/1733 - 6/1734	E190/1263/13
6/1734 - 12/1734	E190/1264/01
12/1734 - 6/1735	E190/1264/05
6/1735 - 12/1735	
12/1735 - 6/1736	E190/1264/07
6/1736 - 12/1736	E190/1264/08
12/1736 - 6/1737	
6/1737 - 12/1737	
12/1737 - 6/1738	
6/1738 - 12/1738	
12/1738 - 6/1739	
6/1739 - 12/1739	
12/1739 - 6/1740	
6/1740 - 12/1740	
12/1740 - 6/1741	
6/1741 - 12/1741	E190/1264/13
12/1741 - 6/1742	E190/1264/10
6/1742 - 12/1742	
12/1742 - 6/1743	E190/1264/14
6/1743 - 12/1743	
12/1743 - 6/1744	
6/1744 - 12/1744	
12/1744 - 6/1745	E190/1265/03
6/1745 - 12/1745	
12/1745 - 6/1746	
6/1746 - 12/1746	
12/1746 - 6/1747	
6/1747 - 12/1747	E190/1265/05
12/1747 - 6/1748	
6/1748 - 12/1748	
12/1748 - 6/1749	
6/1749 - 12/1749	
12/1749 - 6/1750	
6/1750 - 12/1750	
12/1750 - 6/1751	
6/1751 - 12/1751	
12/1751 - 6/1752	E190/1265/09
6/1752 - 12/1752	E190/1265/10
12/1752 - 6/1753	E190/1265/12
6/1753 - 12/1753	E190/1265/13
12/1753 - 6/1754	
6/1754 - 12/1754	E190/1266/05
12/1754 - 6/1755	E190/1266/07
6/1755 - 12/1755	E190/1266/10
12/1755 - 6/1756	E190/1266/04
6/1756 - 12/1756	E190/1266/15
12/1756 - 6/1757	
6/1757 - 12/1757	
12/1757 - 6/1758	E190/1267/03
6/1758 - 12/1758	E190/1267/07
12/1758 - 6/1759	E190/1267/05
6/1759 - 12/1759	
12/1759 - 6/1760	
6/1760 - 12/1760	E190/1267/12 Unfit
12/1760 - 6/1761	E190/1267/14
6/1761 - 12/1761	E190/1268/05
12/1761 - 6/1762	E190/1268/01
6/1762 - 12/1762	E190/1268/06
12/1762 - 6/1763	E190/1268/10
6/1763 - 12/1763	E190/1268/12
12/1763 - 6/1764	E190/1268/13
6/1764 - 12/1764	E190/1269/03
12/1764 - 6/1765	E190/1269/01
6/1765 - 12/1765	E190/1269/05

already to indicate that there were important omissions from the Port Books. There has also been concern about the effects of deliberate fraud and of maladministration. This has led scholars such as Jarvis, Woodward and Clark to say that Port Books 'are not statistical in character', and that they only record 'a part of the trade passing through particular ports'[93].

Much distrust of Port Books results from suggestions that smuggling and Customs fraud were widespread, especially in the late eighteenth century. This has been confirmed by studies of the Customs service and smuggling[94]. For the overseas Port Books, corruption of the Customs officers and smuggling may in some cases have seriously affected the proportion of trade which was represented. This should not, however, prejudice the use of coastal books. Since duties were not charged on the coastal trade, smuggling was largely irrelevant. The only incentives to evade the system would have been to save the time of Customs examination or the capital which may temporarily have been invested in the bond: but the fact that cargoes were listed at the ports of both departure and arrival, and the books could be checked against one another by Exchequer clerks in London, meant that such evasion would have been much more difficult than for overseas trade. The most likely effect of fraudulent activity would have been to increase the trade represented by the coastal books, since attempts were known to carry foreign goods under pretence of coastal movement[95]. As Jarvis has commented, '...unless we are to suppose that all the principal officers at a port were at the same time either stupid or dishonest or both, then the system of recording transactions was such that it would have been difficult for any one of them consistently to deceive the rest; in other words, although the books should be examined critically, and certainly accepted with caution, the temptation should be resisted to reject them in general merely because certain specific frauds can be demonstrated.'[96] The potential penalties of trying to evade the system were great, as have been described in a previous section, whilst the rewards were slight. No cases have come to light of merchants at Gloucester attempting to evade the system of coastal control.

A second, allied, doubt about the Port Books concerns the effectiveness with which the Customs system was administered. Carson and others have suggested that the Customs were disorderly and delinquent, particularly in the eighteenth century. Clark, too, emphasised this point, but also made it clear that the procedure of checking coastal traffic at both its port of departure and its destination caused records of coastal trade to be maintained much more accurately[97].

The more realistic problems for modern uses of the Port Books derive from the unknown extent to which goods and voyages were omitted from them. Some of these problems have been discussed at length already where it was pertinent to do so. The

problem of differentiating traffic of creeks from one another and from the head port in the Gloucester books has been shown to be capable of solution with care. In cases where the entries are intermingled, in the earlier records, rather than given separate sections, it is still possible either to study the trade of the group of ports in aggregate or to disentangle the patterns of trade through knowledge of cargoes, merchants, and other internal evidence. Such solutions were used by Andrews himself and others[98]. The omission of traffic which did not extend beyond the bounds of the port is an important factor. As has been stated above, it is clear that there was a substantial trade in iron between the Forest of Dean and the Midlands which was not recorded although it passed through Gloucester itself. However this must have affected seriously the iron trade to an extent unlike any other trades. The market of the Forest of Dean and other estuarine regions for goods from the Severn valley can have represented only a small proportion of total downriver trade.

The omission of voyages which went by let pass and of goods which were on these voyages or were not recorded for other reasons affected the records seriously at certain times. The example has already been given of the appearance from about 1723 of the practice for some iron shipments to be carried by 'sufferance' and not recorded in the Port Books[99]. Andrews discovered from studies of the Kentish Port Books that various goods, such as fruit and stone, for which there was plentiful evidence, were not appearing consistently among coastal cargoes[100]. Such goods were usually carried under the authority of transires rather than bonds and coquets because they were not likely to evade duty, and at various times it seems to have been the practice not to record them in the Port Books. Changes in national and local policy, however, could mean that recording would be taken up again, and large quantities of a previously unseen commodity would suddenly appear. Similar variations may occur in the Gloucester Port Books, but only one commodity has been found which was recorded at one time, but not recorded before or after. This was lime, which it is known was shipped down the Severn[101]. This seems to have been recorded fully in the Commonwealth, for in the year from March 1656, 27 voyages with lime were recorded, but in all earlier and later Port Books only one or two voyages a year, and usually none, were recorded. It is clear from almost every measure that the Commonwealth books were exceptionally well kept, except that they recorded only upstream trade. The number of voyages recorded was nearly twice as great at ten years later.

Other cargoes, too, seem not to have been recorded in the early seventeenth century, but it is unclear whether this reflected under-recording or the absence of trade. The gradual growth of the pot clay trade, for example, suggests that this was a genuinely new commodity: it was not recorded in 1637 or 1647, but there were 7

voyages in 1666, 15 in 1674, 43 in 1684 and 51 in 1705. The trade in clay tobacco pipes also grew gradually, from nothing in any year before 1674, when there was one voyage, to 18 in 1697 and 38 in 1722. This is consistent with knowledge of the development of the pipe making industry of Broseley, which began slightly earlier but may not have been able to infiltrate the markets of the lower Severn until this time[102].

In other cases there does seem to have been a sudden change consistent with changes in recording rules. Timber, for example, did not appear in any books before 1660, but in 1666 appeared on 53 voyages and was one of the most important cargoes in all subsequent years[103]. It seems to have been generally the case that many more goods were recorded in 1666 than in 1637. The number of commodities recorded twice or more nearly trebled, from 60 to 174. An eight-fold classification of traded commodities on the Severn shows that there was a significant rise in the upstream number of voyages with every class between 1647 and 1666, though food and agricultural produce grew the least. This may reflect changes in trading patterns, but it is likely that it included at least an element of change in recording practices[104]. However, between the Customs Act of 1662 and at least the 1730s, lime is the only identifiable item of cargo which was obviously under-represented.

The particular cargoes discussed by Andrews, fruit and stone, were both recorded fairly regularly in the Gloucester books, though neither was on a large scale. Stone appeared on only between one and three voyages a year except in a few isolated years which may have represented particular building projects. It is not clear from this evidence therefore whether there was little trade in stone through the Port of Gloucester or it was under-recorded. Apples were also fairly regularly recorded, though never with great frequency, appearing on only between two and ten voyages a year. This seems a suspiciously low volume of trade considering the place of Herefordshire and Worcestershire in apple growing and other evidence that there was trade in apples[105]. No other fruit was recorded apart from imported citrus fruits. Vessels travelling without a cargo also went unrecorded. This is clear from the ratio of upstream to downstream trade on the Severn. In most years outward voyages represented about 60% of the total, so that many boats recorded passing downstream with full cargoes did not appear to be returning.

The decline in the recording of many commodities and voyages after about 1725 has been discussed above. It is clear that this severely reduced the comprehensiveness of the records, and took the form of reductions in both the number of voyages recorded and the items of cargo on them. This deterioration in the records went unnoticed by Willan, but Clark commented on the decline of the eighteenth century, and questioned

how early it had begun[106]. It seems clear from the Gloucester coastal Port Books that there was a constantly high quality of the records from the 1660s until the 1720s, after which rapid decline set in.

It is worth attempting to test the overall level of integrity of the Gloucester Port Books. A few such exercises have been attempted at other ports, though these have mainly related to overseas Port Books, and therefore probably uncover a degree of accuracy lower than that to be expected of coastal books. Even so, the results have been encouraging. One study by Woodward to compare wine and iron imports from the overseas Port Books for Chester in the late sixteenth century with the local customs accounts kept by the Chester sheriffs showed a close correlation, with the Port Books on the whole seeming the more complete record[107]. A similar exercise comparing the Southampton Water Bailiff's accounts with the overseas Port Books found the latter to be far more detailed[108]; though a comparison of records for Elizabethan Yarmouth, where Customs fraud was rife, was less encouraging[109].

It is possible first to test the Gloucester Port Books against others to gain a measure of the internal consistency of the series. Comparison of Bristol's outward voyages with those inward to Gloucester in 1699 shows that 241 coquets were recorded for Gloucester at Bristol, and 233 were recorded from Bristol at Gloucester. This discrepancy of 8 coquets can be explained by entries close to the beginning and end of the year. Internal discrepancies in the descriptions of the cargo and other matters are slight, occurring in only about 2% of coquets, and mainly being of an insignificant nature explained by clerical error. Voyages between Gloucester and Chepstow in 1699 show greater problems. The recorded coquets from Gloucester to Chepstow were 10 in both books, but the cargoes differed importantly, the Chepstow books recording only the first item or first few cargo items. This was the same in coquets from Chepstow to Gloucester, where there was a larger discrepancy of 31 voyages recorded in the Gloucester books compared with only 25 in the Chepstow ones.

The comparison already discussed of the Gloucester books for 1699 with those for Bridgwater, where let passes were copied out in the same way as coquets, provides greater cause for concern. In this year, the outward coquets from Gloucester were reasonably consistent in both sets of books, and the Bridgwater books recorded no let passes being issued at Gloucester. However the inwards trade to Gloucester showed that an appreciable number of let passes were being issued at Bridgwater which were not recorded in the Gloucester books. Similarly, the creeks of Newnham and Berkeley seem to have issued let passes in the early eighteenth century which were not recorded in the Port Books.

Nevertheless, comparison with other sources suggests a high and representative proportion of trade was recorded in the 1666 to 1725 period. For example, Cox has shown that the iron recorded in the Port Books going from Coalbrookdale to Bristol with the carriers habitually used by Abraham Darby I matched the amounts recorded in Darby's account books being sent to Bristol by river. In the 63 months from March 1719, the Coalbrookdale accounts recorded 921 tons of iron going to Bristol and the Port Books recorded 927 tons[110]. There was also a close match between the number of voyages known to be made annually by particular Severn watermen from evidence in an Exchequer Court Case of 1705 and those recorded in the Gloucester coastal books[111]. In the late 1720s, one third to half of all salt produced in Droitwich was recorded passing through Gloucester: the maximum amount that could be expected to be traded along that route[112]. In 1697, upstream copper shipments recorded on the Severn represented such a high proportion of Houghton's estimate of total production that his own figure must be questioned[113].

Detailed study of the Gloucester coastal Port Books shows that evidence derived from them can be coherent. Examination of many commodity trades, such as those described in detail in Chapters 5 and 6, shows a remarkable consistency of the patterns revealed, which themselves prove to be consistent with factors known to have affected them. For example, the seasonality of the upstream tobacco trade recorded is consistent both from year to year and with the dates of markets held in Bristol. Longer-term fluctuations in the tobacco and the salt trades are consistent with the timing of events which would have affected them, such as wars, blockades and changes in supply. Such circumstantial evidence all points to a high level of accuracy in the Gloucester Port Books, at least for some commodities.

The quality of the Gloucester books varied over time. The most accurate periods of recording were from the 1680s to the 1720s, and in the 1650s. The Coast Books of the Commonwealth period are the fullest and most reliable, and it is unfortunate so few have survived. It is clear that the records declined rapidly from the 1720s, and most evidence for this period can only be used illustratively, to show that certain activities were taking place rather than to measure them. Even in this period, however, commodities such as coal, bricks and salt which were subject to domestic duties seem to have been recorded accurately until the 1760s.

The late Professor Flinn proferred wise words on the problems of using statistical evidence in the study of the pre-industrial period: 'A figure appears to be a fact, and a conclusion logically and accurately drawn from such figures appears unchallengeable. While this happy situation may be true of many twentieth-century economic statistics, it

is unfortunately very seldom true of eighteenth-century statistics. None of the available figures relating to eighteenth-century economic development is wholly reliable, and some of them are devastatingly misleading. Trade figures cannot take smuggling into account...; population figures reflect only registered baptisms and burials, not actual births and deaths; and most other "statistics" are merely somebody's estimates... In the study of eighteenth-century economic history it is seldom safe to accept a generalisation based on figures alone, unless it can be supported by some confirmatory, non-quantitative evidence.'[114]

This said, Flinn asserted that statistical approaches were of immense value, in allowing hypotheses to be tested against fact, bringing to light significant developments that have escaped notice, and contributing to historical perspective. Although Port Books present some problems, confirmatory evidence is available which suggests their reliability, and this is especially so for the Port of Gloucester. The strongest critics of Port Books, Andrews most notable among them, have employed it in studies of trade[115]. Williams, whose work on Shaxton illustrated the possibilities for contemporaries to evade duties, used them extensively in his work on the maritime trade of East Anglia[116]. Much of the distrust of Port Books has been based largely upon the weaknesses of the overseas books rather than coastal ones. Though the coastal books may have had some biases, they are the best records we have of internal trade in their period. Compared with some other important historical sources, such as parish registers or poll books, the biases of the Port Books are minor and relatively retrievable. As Stephens points out, '...without them it would be extremely difficult, and often impossible, to make any meaningful statement about the development of trade, especially in the sixteenth and seventeenth centuries'[117]. Many of the problems of interpreting the trade recorded in the books have already been solved, and solutions to others are possible with continuing research. Just as the biases and omissions of parish registers and the Census have been discovered and notionally corrected by recent research[118], the faults of the Port Books can be tackled.

CHAPTER 2.

PORT BOOKS AND COMPUTER-AIDED ANALYSIS

The last chapter showed that, despite their great potential, Port Books have been under-utilised. One reason has been that they have been seen to present problems of interpretation; but perhaps even more important has been the logistical difficulty of abstracting and analysing the exceptional quantities of data they contain. This problem is reduced substantially by methods developed during this study.

The core of the study has been the design and implementation of a computerised database of the Gloucester coastal Port Books. One result has been that a quantity of evidence has been examined and a variety of analyses performed which could not otherwise have been contemplated. These have concentrated on a very large and representative sample of the records. However the aim has been pursued of creating a comprehensive database of the Gloucester Port Books, and this is now available to provide evidence for a wide range of additional investigations. Furthermore, the database has been designed to be applicable in future research at any port in England and Wales. Sample books for Chepstow and Bristol have been computerised for this study, and work is extending to other ports[1].

The primary aim of this chapter is to set out and justify the techniques of computerisation and computer-aided analysis used in this study, so that its findings may be assessed and understood. A subsidiary aim is to indicate implications for future research of the methods developed.

i. Computerisation and the logistical problems of the source

Perhaps the greatest problem of Port Books has been that they are so numerous and detailed as to make logistically prohibitive their study in a thorough or comprehensive manner. Stephens has emphasised that, 'the bulk of the material is enormous, and, particularly for the period after 1660, a detailed examination can only be the work of many hands'[2]. The difficulty of retrieving data has defeated most historians, who traditionally have worked alone. The Port Books provide a vast volume of information spread thin, not a small quantity of intense significance. In this sense they can be contrasted with sources like the Customs Accounts, which provide

summary statistics of trade in certain commodities. These have been widely used because they readily provide a simple measure of trade; unlike Port Books, which provide similar information only after labour-intensive examination but present far more detail. As Minchinton pointed out thirty years ago, even for much of the seventeenth century (when summary statistics were not compiled) Port Books have not been utilised effectively. He recognised that the problem was one of bulk, and suggested precociously, 'now that data-processing equipment is more readily available further work should be possible'[3].

The result has been that whilst Port Books have been used by historians of internal trade, they have been used much less in studies of imports and exports, for which summary sources are available. They have also been used only infrequently in studies of particular trades and industries, which require searching for relevant parts of relevant entries. Manually extracting small fractions of the information contained is usually prohibitively time-consuming[4].

Not only have many distinguished historians bypassed the source[5], but results from many surveys which have consulted Port Books have been limited in scope and authority[6]. As indicated in Chapter 1, most of these studies have necessarily been confined to specific commodities[7] or single ports[8] (or both), and few have ranged widely or used systematic analysis. Almost all the studies which have used Port Books thoroughly have focused on the late sixteenth or early seventeenth centuries when the records are much less extensive[9]. Most damagingly, the enforced narrowness of research has sometimes resulted in a failure to understand fully the source and its proper interpretation.

Even Willan, in the most substantial study of coastal Port Books yet undertaken, found it necessary to reduce radically the quantity of his material by choosing only a few sample years for a small selection of ports and investigating relatively few commodities. He quantified traffic only where it was specially important and made general comments to convey an impression of the remainder of the trade[10]. The series of single year samples many decades apart which he employed could not be tested against adjacent years or longer periods. The result was that variation between years was interpreted as long-term development and changed standards of recording were misinterpreted as changes in trade[11]. Other writers have drawn conclusions from much shorter periods: for example Metters based his conclusions about King's Lynn in the early seventeenth century on Port Books from 1604 to 1614[12]. Others still have taken a sample limited geographically, and this too has created hazards of interpretation.[13]

This study shows that the application of information technology to Port Books

can tackle effectively the problems associated with their bulk. It, too, has had to be based on a strategy of sampling, but the sampling has been intensive, and the computerisation of the full source recently accomplished will make the use of samples unnecessary in future, except in so far as the records themselves are incomplete. The database designed proves that it is feasible to create a machine-readable version of the Port Books which is both reasonably efficiently processed by computer and incorporates nearly the same words and characters as the original. An approach of 'comprehensive computerisation'[14] has been developed in distinction to computerising only selected data or rigorously classifying and encoding[15]. This is distinct also from literal transcription and text mark-up[16] which may be judged unnecessarily cumbersome for a source which is logically ordered and standardised.

Such comprehensive computerisation is time-consuming, taking much longer than verbatim transcription, but it makes the source infinitely more manageable. First, it makes the whole body of information available at one computer terminal, thereby transforming the practical capacity for investigation and experiment. More importantly, it negates the adverse implications of the material's bulk in terms of words and facts: making all the information accessible through the mechanisation of searching, sorting and summarising.

Another challenge of working with Port Books has been the diversity of factual information they contain. This can be expressed in terms of the different classes of information, such as ports, boats, merchants, masters, dates, weights and measures, burthen, and cargo; and also in terms of the vast range of values or items that are present within each class (the Gloucester Port Books contain some 12,000 different ways of describing commodities, 80 ports, and several thousand personal names). The first implication of this diversity is that the scholar must select a very small number of the infinite varieties of cross-referencing and analysis that are possible. This selection may later prove unsatisfactory owing to discoveries about the quality of the evidence or to the development of interpretations which require further testing. Second, information collated by any historian is unlikely to be that required by future scholars, even those undertaking broadly similar enquiries, and the effort of extracting information needs to be duplicated again and again.

Access to Port Books in computerised form permits a series of interrelated enquiries to be undertaken comparatively rapidly. As a result, thorough summaries of different parts of the information are feasible, such as the numbers of voyages to and from particular ports, or the volume of trade in particular commodities. It is also possible to correlate different variables or search for explanatory patterns. For

example, it becomes possible not only to count the total shipments of iron out of a port, but to extend these over many sample years, to estimate the quantities shipped according to alternative conversions from the units of measure in use, to compare the ratio of outward shipments to inward, to examine the correlation of variations in the volume of trade with the level of activity of particular merchants, to break the figures down by destination... and so on. The possibilities are endless. The use of a computer makes analysis practicable which would otherwise be out of the question. The limits become instead the time and space available for discussing and digesting the results.

With the Port Books computerised for major syntheses, data are also accessible for important but less wide-ranging historical enquiries. A database can be searched for information which may appear only rarely. For instance, a search can be made for new and relatively uncommon crops or industrial raw materials to shed light on their innovation and diffusion. Searching the original documents for such rare items would be impossibly unrewarding, and skipping one or two occurrences would affect the results significantly. The roles in trade of individual merchants and masters can be traced. The case histories of particular vessels can be written. The range of enquiries is almost endless once the process of computerisation is complete. In many cases the data made available may suggest new themes worthy of investigation. In such circumstances the facility that computerisation provides for re-examining the full extent of a very bulky source can liberate far more knowledge from the historical record than predicted at the outset.

The capacity to re-organise the data from the Port Books in order to experiment and search for patterns is vital to the interpretation of the minute data they contain. Trade involves complex patterns of seasonality, irregular fluctuation, personal interaction and regional and mercantile specialism. These patterns can best be detected by re-organising information in many ways to bring out different associations, rather as police detectives put apparently unrelated facts together in different orders to see if any systematic relation between them emerges. Computers are especially valuable for this sort of task, since they allow facts to be drawn from a large database and reorganised.

A simple example of an investigation from the Port Books, of one merchant, illustrates this point. First, a listing of all entries in a year with the merchant's surname is needed, giving the merchant's Christian name, the boat, the home port, and the date. This may isolate all the voyages of one man, as distinct from others with the same name, and indicate the frequency of his voyages, the number of boats he worked and whether he occasionally operated out of different ports. It may become apparent that members of his family effectively worked in concert, for example taking the same

vessel on alternate voyages. A listing of the voyages of all people with the same surname and boat names, arranged by destination and date, may indicate that they specialised in regularly-spaced trips to a particular port, interspersed with occasional voyages elsewhere.

A series of analyses of the individual merchant's activities as opposed to those of his family may indicate the number of different boats he worked, the regularity with which he worked different boats (which might suggest which he owned and which he rented), the frequency with which he made voyages, the seasonality of his voyages, and other aspects of his activities. A study of the routes he worked and the commodities he carried may indicate whether he had any specialisms. These should be set in a context of other merchants trading at the port, for example to suggest what share of all outward voyages he was responsible for, what proportion to particular destinations, and what proportion with a range of different goods. The presence of other merchants in the same trade may require a quantitative analysis of the goods carried by each so that competition between them can be assessed. The same surveys should be undertaken examining the named person as a master, to see if his voyages as master had a different character from those as a merchant. An analysis could then be made of the links he had with other merchants or masters with whom he worked. Inevitably, similar studies might have to be undertaken for many of these people to indicate the nature of the relationship from their side as well as the side of the merchant in question.

Similar analysis could be carried out for a long period. This might indicate the developing career of the person in question, in terms of the changing emphasis of his activities as master or merchant, the changing number of boats he operated, his relationships with people in his early career who it may transpire were his direct family or masters to whom he was apprenticed. The number of questions grows almost exponentially; and many reap worthwhile and quite unexpected rewards.

The end result of such analysis is that light is shed on the organisation of trade and mercantile communities. The mechanisms by which particular goods were carried and the extent to which patterns of trade were defined by opportunity rather than need may become apparent. Many important supplementary questions may emerge. However, the pursuance of such findings relies on the ability successively to re-sort and reassess the total body of information in a multitude of different ways. This is difficult and time-consuming even with the assistance of a computer. Without that assistance, it would be a prodigious feat and perhaps unduly demanding of time and effort that might be spent elsewhere.

ii. The Portbooks Database

At the beginning of this study, computerisation of the Gloucester Port Books had already been initiated, in 1982, by Dr J. Cox and Dr M. Wanklyn of Wolverhampton Polytechnic. This initial project was to buy microfilm of Gloucester coastal Port Books and extract information about boats of Shropshire ports for studies of Shrewsbury boats and of the activities of Abraham Darby[17]. A prototype method of computerisation incorporated in abbreviated form selected information about each voyage, relating to the boat, port, master and merchant, date and destination. The data took the form of a 'flat' file of abbreviations in a columnar format, each record occupying no more than 80 characters. Data about the voyages of Shropshire boats between 1616 and 1725 were entered into a Prime mini computer by the Polytechnic's Data Preparation staff.[18]

This system had important limitations. First, it was incapable of dealing with the information about cargoes which is by far the largest part of the entries in the Port Books and is essential to most potential uses of the source. Second, it omitted other data, for example marginal marks, second dates related to voyages, the burthens of vessels, and miscellaneous information. Third, it represented most of the data in an encoded form. Finally, it permitted little flexibility of analysis, being capable only of sorting entries into orders defined by particular columns and selecting entries with specified contents.

The author was appointed in 1984 to devise a more flexible and complete system. The new database was implemented in 1985, and was refined and developed during 1986 and subsequently. The aim was to set in train computerisation of the whole of the information contained in the Port Books for Gloucester, with the intention in the first instance of allowing a study of the trade of the River Severn in the period from the mid seventeenth century to the end of the Port Books series in 1765. It was judged that this database should take a faithful and comprehensive approach to the source which would permit a much wider range of studies to be undertaken after the principal project was over.

Assistance with the selection of software and technical backup to its development have been given by Wolverhampton Polytechnic Computer Centre, and especially by Mr Mike Griffiths[19]. The author designed the brief for the system, the transcription procedures, the data model of entities and their attributes in the source, and the relational structure. The software was the commercially available 'INFORMATION' database management system, with the addition of the 'PACE' 'fourth generation' 'front end' software to permit more sophisticated data entry and

analysis. Both were operated on the PRIME mini computer at the Polytechnic[20]. The limited data from the file of Shropshire voyages was imported into the database system, altered manually to conform to the database and expanded to add the cargo and other missing information (though in retrospect it would have been more efficient to begin afresh[21]). To assist in processing the immense volume of data about other voyages, a network of some 60 volunteers was established to transcribe records onto data entry forms which were entered by data preparation staff at the Computer Centre.

The most significant contributions of the new database design to methodology concern the recognition of entities and attributes within the source and the development of a model for structuring them in a computerised form. This model has been designed to be applicable to Coastal Port Books for any port in England and Wales from 1565 to 1799. The implications of this are to permit studies to be undertaken by other scholars without the need for extensive developmental work, and to enable the replication of any investigation, thereby facilitating comparative and sequential studies. This has borne fruit already with the successful creation of databases for 21 other ports[22].

The data model was devised after close scrutiny of a representative sample of the Gloucester Coastal Port Books together with similar records for other ports. Consideration was given to all the uses of the data that could be predicted to ensure that the system design would not preclude them. Finally, a test database was established using a sample of the records and the practicalities of transcribing and using the records according to this model were examined. The design was modified to create the implemented model in 1986[23].

Figure 2.1 shows a data entry form onto which information has been transcribed, and figure 2.2 shows the original from which it derives. The data structure has been designed in accordance with the British Standards Institution's recommendations for data to be exchanged[24]. Some re-ordering of the data has taken place to create a regular format, and in a few cases their expression has been abbreviated. However, no part of the written details has been excluded from computerisation, and modification has been permitted only if it will not make analysis dependent upon interpretations which might be revised.

The most crucial elements in the design, in terms of their effects on the interpretation of the evidence and the future applicability of the data model, are concerned with the recognition of entities and attributes within the source and the methods used of transcribing these into a machine-readable form.

Each entry in the Port Books is regarded as an entity and forms a record in the database, and the data it contains is broken down logically into 21 attributes or field

Figure 2.1

Portbooks Database data entry form

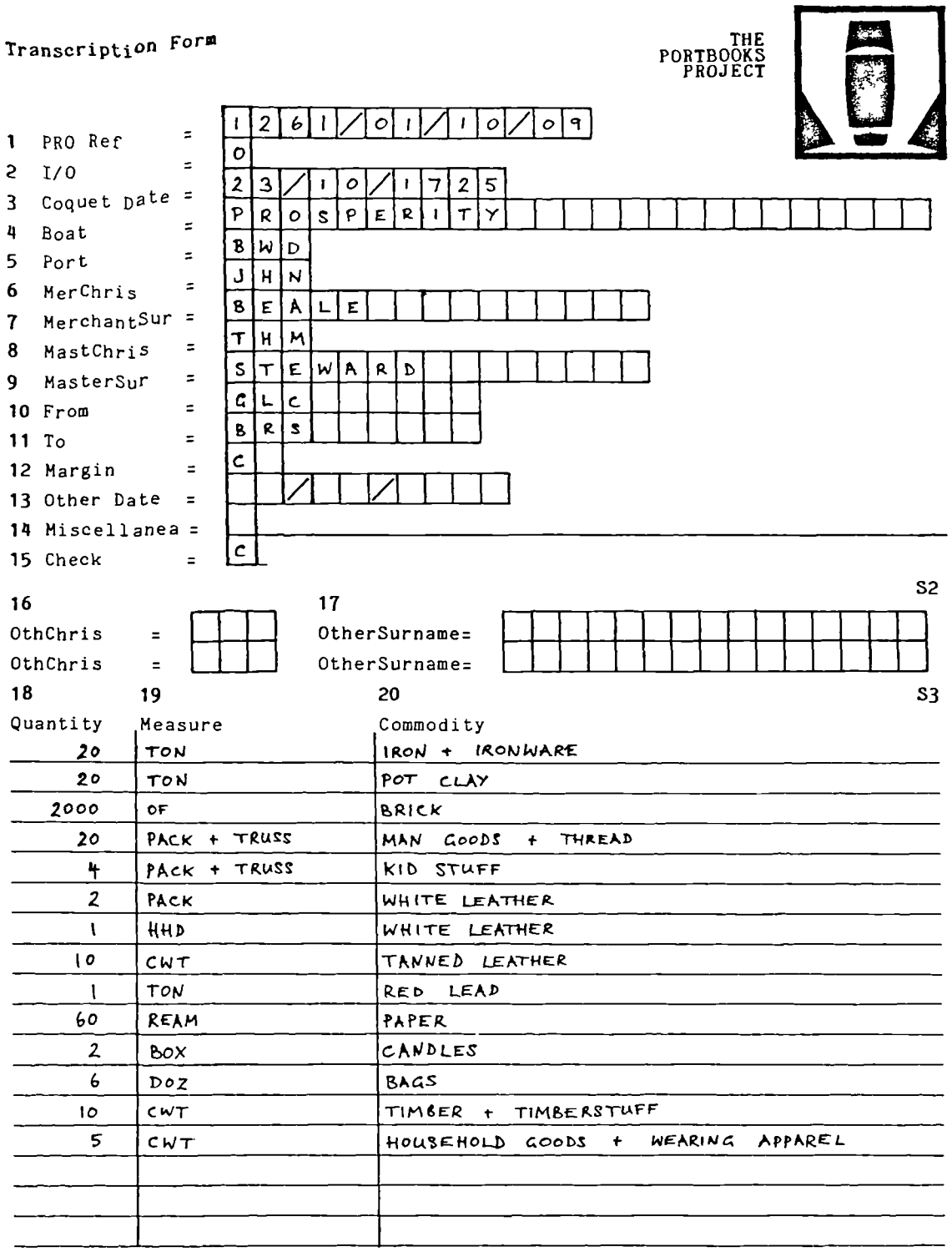
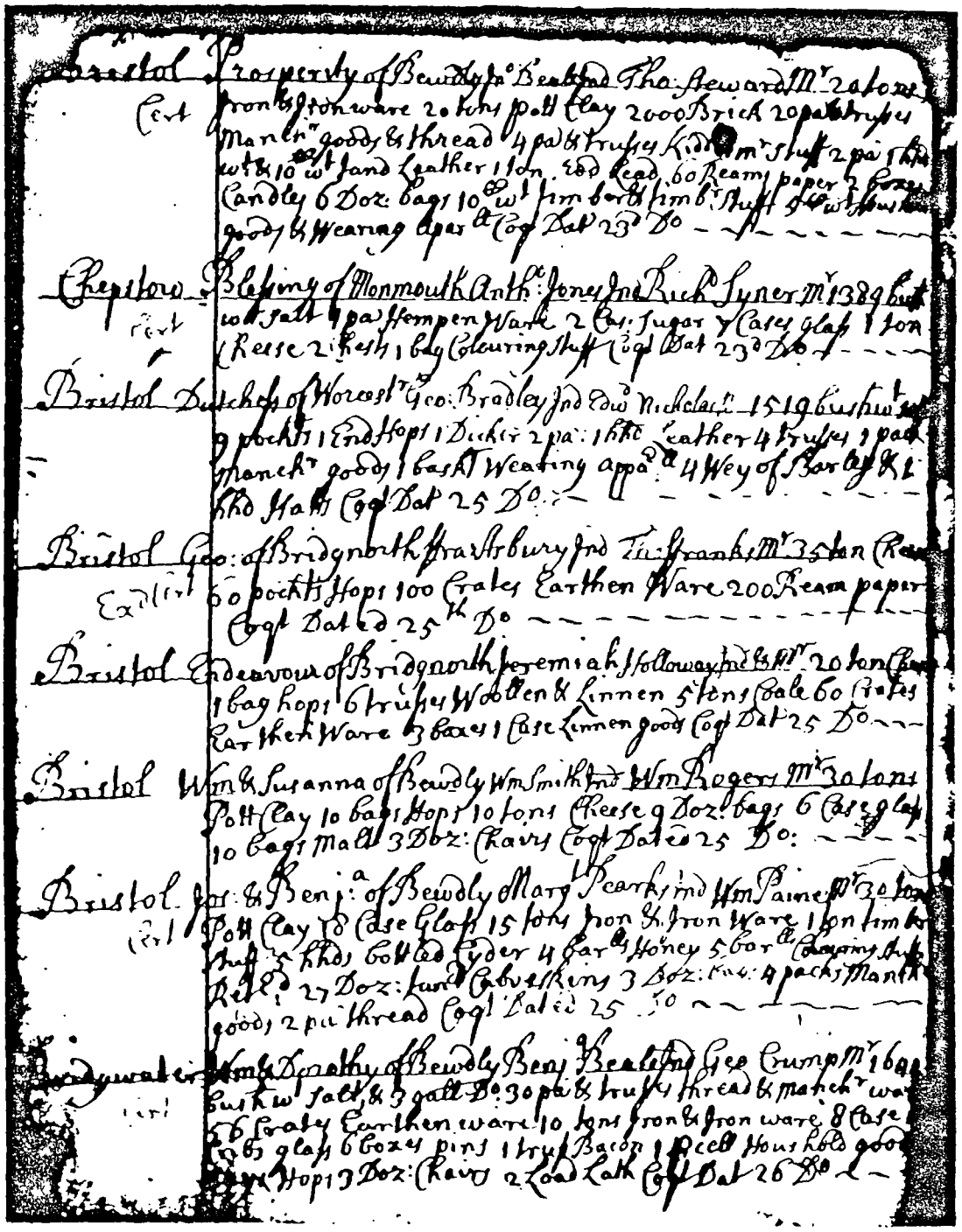


Figure 2.2

Sample page from a Gloucester coastal Port Book
Outward voyages in October 1725, E190/1261/01 folio 10



types, some of which, such as that for the cargo, are 'multiple' fields which can be repeated to accommodate many items. An average record thus contains about 50 fields.

The designation of entities and attributes is a complex process, vital to the successful operation of a database[25]. There is no single way to categorise and structure historical data, and a method must be found of doing this so that the data can be computerised and yet used flexibly. The entity recognised for the purposes of the Portbooks Database has been the entry in the books, chosen to keep the computerised version of the source as close in principle to the original as possible. The entity chosen could have been the *voyage* as opposed to the *entry*. Voyages had more than one coquet in some circumstances, and this method would unify them. However this would be imposing an interpretation on the source without certainty that it was the only plausible interpretation. Other entities, such as boats, merchants, or masters could have been recognised. However these are treated as attributes of the entity which is the Port Book entry. Examination can still be made of the boats and the merchants and masters, because they are identified as clearly separable attributes, without re-organising the source material so artificially.

The attributes of each Port Book entry are broken down as fully as possible in the data model so as to allow the maximum flexibility in their analysis. This procedure is quite different from that in databases in which certain data can be summarised or conflated as they have no significance at any smaller scale, for example because the use to be made of the database is precisely pre-defined. In comprehensive computerisation of a source, attributes need to be treated as separately as possible, to permit types of analysis that may not be predicted at the outset.

The attributes of the Portbooks Database are shown in Table 2.1. The first attribute is the key to each entity, consisting of the box number within class E190 at the Public Record Office, the piece number, the folio number, and lastly a number allocated to each entry number within the folio. Following this is the attribute which indicates whether the entry comes from an inward or an outward section of the Port Book. This information is clearly an attribute of the voyage, not a separate entity. Similarly, the coquet date is an attribute of the voyage. This has been treated as a single attribute rather than three: the day, the month and the year; but these are separated by slashes so that a programme can be used, for example, to count the number of entries per year or month.

The next two attributes are the boat name and the home port. Although these may be read as one piece of information and together served the single purpose of identifying the boat to the Customs officers (separating the William of Tewkesbury

Table 2.1

Data Item List for the Portbooks Database

Attribute name	Definition and explanation
PRO Ref	Entity key and unique number identifying PRO box, piece, folio and entry number.
I/O	Direction of entry, inward or outward.
Coquet Date	Date of coquet or other Customs document administering voyage.
Boat	Name of boat.
Port	Port with which boat is associated in entry.
Merchris	Christian name of person styled Merchant.
Mersur	Surname of person styled Merchant, and their status as senior or junior if given.
Mastchris	Christian name of person styled Master.
Mastsur	Surname of person styled Master, and their status as senior or junior if given.
From	Port of departure stated or implied.
To	Port of destination stated or implied.
Margin	Marginal notation to entry.
Other Date	Date stated other than coquet date.
Miscellanea	Data stated for which there is no standard attribute, in particular occupation and residence of merchant, burthen of vessel, information about duties paid. Also indication of association with another entry if relevant.
Check	Person who has checked transcription.
Othchris	Christian name of person other than master or merchant.
Othsur	Surname of person other than master or merchant.
Cargo Quantity	Numerical value associated with cargo item.
Cargo Measure	Unit of measurement associated with cargo item.
Cargo Commodity	Cargo item or indivisible group of items.
Cargo Additional	Additional information associated with cargo item, about packing, duties, or status.

from the William of Bridgnorth for example), they have a value as separable attributes. It is important to be able to select or count voyages by all boats 'of Bridgnorth' as well as those by an individual boat. It may also be important to establish whether some boats became associated with different home ports at different times, or to examine how many ports had boats of the same name.

The merchant's Christian name and surname have been regarded as separate attributes, rather than as just one, as the surname has a value in itself as an indicator of kinship. The same applies to the master's Christian name and surname. Both surname fields may also designate the person as 'senior' or 'junior'. This information could be regarded as a further attribute, but it is intermittent and so has been included in the surname fields[26]. Two pieces of information have been omitted: the words 'Master' and 'Merchant' or their various abbreviations. These are inherent in the labelling of the separate fields for master's and merchant's names as separate fields. This is truthful to the records in so far as it is almost always clear that one name refers to the merchant and one to the master. The most important exception to this is that in some Gloucester Port Books the word 'Merchant' or abbreviation 'Mert' is replaced by the abbreviated 'Ind', which is assumed to have meant 'Indenturer' or the person responsible for the cargo in the same way that the merchant was. This might have been deemed a separate attribute, but careful examination of the books where this term appears shows that it is simply an alternative word used ubiquitously when certain clerks were writing, and it is written in such a way that it is in any case *impossible usually to judge whether the 'Mt' or 'Ind' abbreviation is used.*[27].

The next attributes are the ports from and to which the voyage was said to be going. In the outward sections of Port Books, the port of departure was not actually written, but was clear from the Port Book or the section in which the entry was recorded. The destination was stated usually at the end of the entry or in the margin. In inward sections, the position was reversed, and the port of arrival was clear from the context whilst the port of departure was specified. As both these pieces of information are attributes of the entity, whether stated explicitly or not, both have been given fields in the database. In a few cases multiple destinations were given, for example boats were said to be sailing to 'Minehead, Cardiff and Newport'. This has been regarded as one attribute rather than three since it describes most accurately the entry in the Port Books: in any analysis, such entries must be regarded as one voyage, not as three voyages carrying the same goods to three places.

The remainder of the fields before the cargo are used for storing attributes not always present in the records. The first two occur only rarely and their exact meaning is uncertain. In a database not concerned with comprehensive computerisation of the

source, such data would be omitted. Marginal notations such as 'Certificate' or 'Returned' are stored as a one letter abbreviation in the Margin field if they appear. Second dates, other than those of the coquet, are also recorded as separate attributes if they appear. These are most commonly dates of arrival when found in the inward sections of books, supplementing the usually given dates, i.e. those on which coquets were issued at ports of departure. Some other kinds of date are also given, and it is a failing of the current database that it does not permit any indication of the meaning of a date when this is stated or can be inferred. In a few cases, the later Port Books give only the date of arrival for inward voyages, and not the coquet date at all. This has been placed in the coquet date field, so that a convenient date for sorting and searching the entries is always available in the same location, again with no annotation to indicate the fact. These aberrations indicate the challenge of designing a data model even for an apparently well-structured source like the Port Books.

The Miscellanea field is used to store information which appears rarely and in many cases cannot be said to form a classifiable attribute. Examples of these are a note that a boat sank with all hands, or that a particular item of cargo paid a special duty at another port[28]. Some information currently in this field might be regarded more appropriately as an attribute: for instance the burthen tonnage of vessels given in some cases, or the occupation or place of residence of the merchant. These are too rare to justify creating a separate field in every record, and a compromise approach has been taken of transcribing the data relating to these attributes in a standard form, enabling their transfer to another field should the need arise and permitting them to be searched and ordered to a limited extent in their current form. The Miscellanea field also holds an indicator when there are two entries for one voyage[29]. Because the *entry*, not the *voyage* has been regarded as the entity in the Portbooks Database, the two need to be cross referenced[30].

People other than the merchant and the master have been regarded as comprising two linked attributes, one for their surname and one for their Christian name. These further names occur very seldom after the Civil War, but give useful information before that date about additional bond holders[31].

The most intellectually challenging data to encapsulate within a formal data model have been the cargo descriptions. As Table 2.1 shows, each cargo item is broken into four attributes: numerical value, unit of measure, commodity, and additional information. Some entries in the Gloucester Port Books contain as many as 50 cargo items which may therefore be represented by up to 200 fields. Imposing a structure like this is a complex operation which is vital if the computer is to manipulate the data fruitfully. It is obvious enough that numbers must be in separate

fields if the computer is to add them up, units of measure must be identifiable, and commodities distinguishable from their containers; but none of these restrictions were imposed on the clerks whose descriptions of cargo must be computerised.

The rules devised for disaggregating the Customs officers' descriptions into these attributes are stated in full in Appendix 1. Most cargo items are straightforward enough in following the model attribute relationships: for example '30 tons of Pot Clay' can readily be divided into four attributes, the last of which is void. The additional attribute is used for a cargo item such as '5 hogsheads tobacco returned', when the fact that it is returned is the additional information.

An item like '15 tons thread and Manchester ware' is also reasonably straightforward, once one accepts that there is no way to separate 'thread' from 'Manchester ware' as different commodities, since there is no indication of how much of each was carried[32]. However, it is important to be able to identify particular commodities whether or not they are part of an indivisible item, for example if one wishes to count the number of voyages carrying 'thread' as opposed to the number with 'Manchester ware'. Different commodities in the field are therefore separated from one another with a '+' sign so that searches can be made for items whether they are alone or with others. In effect, a sub-attribute has been recognised within the commodity attribute, although the flexibility with which this can be manipulated is limited by the ambiguous information about its quantity.[33]

The way in which the source was written has to be departed from with a description such as '2 chests 1 bag Colouring Stuff'. This can be resolved as two separate entries for which the quantity of each is known. The same can be done with an entry like '1 Dicker 2 pa white and tanned leather', but this presents greater problems of interpretation, as the statement that results is not identical to the original: there may not have been one dicker of white *and* tanned leather, but one dicker of *either* white *or* tanned leather. Care has to be taken in analysing results to ensure that measures of multiple commodities are treated separately from ones which are specific. '10 doz boxes candles' is unambiguous but presents the problem of having two interrelated units of measure: the dozen and the box. The dozen is regarded as a unit of measurement when no other is given, for example in '4 dozen chairs', but the policy in this instance is to multiply the quantity by twelve and make 'box' alone the unit of measurement. An entry such as '20 hhds bottles cider' is treated in a different way, as no multiplication is possible, by regarding 'hogshead' as the unit of measure but 'bottles cider' as the commodity.

A few individual entries emerge which necessitate judgments about their meaning in order for them to be entered into this data model. One example is the

entry '3000 of brick', which might refer to 3,000 bricks or to 30 cwt of bricks. The answer is to follow the original as faithfully as possible and enter 'of' as the unit of measure and 3,000 as the quantity. If the entry had said '3000 wt bricks' it would be transcribed with 30 as the quantity and cwt as the measure. An additional ambiguity here is that 'wt' may have been an abbreviation not for 'weight' but for 'white'. Rules defining how such entries should be tackled are given in the Portbooks Database transcription handbook. However, users of the database will be no more badly off than with the original source.

One of the most common uses for the additional cargo field is where an equation is provided between different units of measure. For example a typical tobacco cargo may read '5 boxes 3 casks and 4 parcels of tobacco qt 1,750 lb'. Rather than divide this into three cargo items, one for each unit, this has been inverted so that the numerical attribute is 1,750 and the measure is lbs. The details of how the tobacco was packed are placed in the additional field. This has the advantage also that the most standard unit for statistical use is entered where it can most effectively be used. An opposite approach is taken with cargo descriptions such as '8 trusses of English wool qt 12 C 3 qr 8 lbs'. Although this could be entered as just one set of cargo attributes, it is inverted to make three sets in order that the more standard units of measurement, rather than the variable 'truss', can be place in the measure field.

Having described the design of the data model, it is necessary to explain more clearly how the data have been transcribed. There is a constant tension in transcribing a document to be manipulated by computer between, on the one hand, standardising or 'normalising' words and phrases so that they can be searched for and ordered most efficiently, and on the other transcribing them in the most accurate fashion. In fact, the latter policy is impossible since many symbols and abbreviations cannot be represented by the characters of a keyboard. Yet extensive standardisation may undermine use of the completed database. A compromise approach has been developed to preserve the integrity of the records whilst ensuring they are amenable to manipulation. The definitive rules for the transcription of the records are given in Appendix 1.

Two policies have been followed with regard to the transliteration of words from the manuscripts: first, standardising spellings (or abbreviating them to a standard form) where the meaning is certain, and, second, accurately transcribing words about which there is doubt. This is illustrated in figures 2.1 and 2.2. Ports, for instance, have standard abbreviations, whilst surnames are transcribed in full following the original spellings. Abbreviations have been used to facilitate transcription and data

entry. These are extended in displays and reports so that they can be read easily by people not familiar with them. If there is any danger of confusion, the full name can be entered instead. Some problems have emerged from the use of abbreviations where transcribers have confused one with another, or where it is not clear from the documents whether boat names such as the 'Prosper' and the 'Prosperity' were intended to mean the same thing and can be standardised identically. Mistaken abbreviations have been altered in the database when discovered and an effort has been made to avoid standardisation of names such as the 'Prosper' which are uncertain, but rather to allow for the fact that two different names may refer to the same vessel. Undoubtedly, some mistakes will have slipped through the net of checking.

The aim has been that no data should be simplified in ways which would prevent analysis of their most detailed meanings. Thus the temptation has been resisted to record cargoes by a classification instead of the original, highly varied terminology. The order of the commodities in the cargo description has also been preserved, in case this proves of some significance. However a decision was taken generally to normalise the spelling of commodities. For example, 'Colouring stuff', 'Coloring stuff' and 'Cullaring stuff' are all entered in the standard form 'COLOURING STUFF'. Where some uncertainty exists, as in the case of word 'Collars', which might be dyestuffs or apparel, this has been left in its original form. Standardisation has been exercised over *spelling* and not *phraseology*, and the temptation has been resisted to regard phrases such as 'Kidderminster ware' and 'Kidderminster goods' as the same thing. This policy has proved satisfactory in the vast majority of cases and for the vast majority of purposes, though there have been some hazards. For example, consistency has been overlooked in the transliteration of 'Week yarn', which has sometimes been transcribed as 'WICK YARN' and sometimes as 'WEEK YARN', introducing uncertainty into the study of these commodities. Consistency is a hard master when there are thousands of different terms and tens of transcribers involved. The value of the database in certain specialist investigations has also been affected by the policy of standardising spelling[34].

However the transcription methods used have been extremely faithful to the source by comparison with most previous computer-based research projects[35]. Because classification was not used in entering the commodities, words whose meaning were not known have been included, and specialist classifications tailored to particular needs can be imposed at will without distorting the data.

The temptation to standardise spellings of surnames has been resisted. The variations in spelling of one merchant's name can be substantial, as in the example of

a name like Coldrick which can be found in nearly twenty different spellings more dependent on the individual clerk at work than the person being identified. To record all of these as 'Coldrick' would have grouped records relating to one boatman, but might have failed to distinguish other individuals whose names were spelled consistently as, for example, 'Coulerick'. Surnames have therefore been spelled as in the original so that premature judgments do not affect the stored data. Sorting and selecting names which are spelled erratically is assisted by a separate file of standardised equivalents. The database can be interrogated by reference to the standard surnames, or by the original spelling if that is preferred, and judgments about surnames can be reversed.

Following the design and initial implementation of the database, an approach had to be devised to transcription and data entry. It was judged important, for the sake of potential use of the data in the long term, to set in train a programme for the computerisation of all surviving Gloucester coastal Port Books from their start in 1581 to their end in 1765, and not simply those needed for this study. This is an enormous task which it was realised from the outset would take longer than the time permitted for this thesis, and a carefully selected and substantial sample of the books from the period covered by this study was prioritised for entry. The computerisation of the whole series of records, containing approximately 38,000 entries, is nearing completion in July 1991, after seven years' work. The systematic checking and correcting of the database will continue into 1992.

Volunteers were sought to transcribe the Port Books by contacting leaders of adult education classes and publicising the project in newspapers and local history journals throughout the Severn Valley in 1985 and 1986[36]. The result was that over 60 transcribers contributed to the work, some over as long as five years[37]. The creation and administration of a system to pursue the work and ensure accuracy was a major task. However a database of all of the Gloucester Port Books could not have been contemplated without it. Similar methods might enable the computerisation of other large sources.

The system of working with volunteers necessitated use of microfilms from the Public Record Office. All 160 Port Books were photocopied from the microfilm and bound into volumes resembling the originals. The folios and entries in each book were numbered and the books given to volunteers, with sample transcriptions and detailed rules which aimed to cover all eventualities and were regularly updated (Appendix 1). All volunteers were provided with word lists to assist in reading the documents and standardising spellings or using abbreviations. Word lists were

provided for boats, ports, Christian names, surnames, units of measurement and commodities. Forms were provided for volunteers to note the work they had done, queries to be attended to, and new words encountered. Follow-up visits were made to each transcriber to answer queries concerning palaeography or methods of transcription, and to ensure that work was consistent. When completed, the forms were collected, examined for clear inconsistencies, and corrected before being passed to Data Preparation staff.

The contribution made by volunteers to the project has been invaluable, although the demands in terms of practical organisation and data management have been great. The most demanding tasks have been planning the work of geographically dispersed volunteers and, because the volunteers have sometimes been working from poor quality copies or have not been experienced in transcription, ensuring the accuracy of data entered.

A detailed strategy has had to be developed to ensure accuracy and consistency within the database. The first matter of concern is that transcription should be faithful to the documents. This has been aided by the visits to volunteers, and the word lists and query forms. If volunteers still have doubts about the transcription of a word, they are instructed to write three crosses in its place. Once entered into the computer, the records containing 'XXX' in any field can be found and print-outs can be checked against the microfilms or, in particularly difficult cases, against the originals at the Public Record Office.

A further check of accuracy is undertaken by validating words as they are entered. This not only checks transcriptions, but guarantees standard spellings where appropriate. Problems could arise, for instance, if commodities were misspelled, since searching is based upon the character strings they contain. Some mistakes over standardised terms are likely with volunteers transcribing unfamiliar words like 'fustic', 'horse nail stubs' or 'raddle'. As each word is typed into the database it is checked instantly against a vocabulary of approved words[38]. The attributes checked in this way are the boat, all Christian names and surnames, the marginal marks, the unit of measure, the commodity, and all ports (whether destinations, home ports or ports of departure). Similar systems ensure that dates are real dates (for example disallowing '30/02/1699') and for the field which signifies whether a voyage was inward or outward. Any item that does not comply with the vocabulary is marked as invalid with the prefix 'INV-'. Printouts of entries containing these can be compared with the microfilms and a decision made whether it is a new word or simply a mis-transcription to be corrected. Without an automated system such as this, the accuracy

of so large a database would be severely compromised.

Several checks are carried out on completion of the data entry: for invalid or illegible words as already mentioned, and for records that contain any empty fields where they should have data (for instance if there is no unit of measure next to a commodity). Three dashes entered at this stage in the field indicate that the information is not given in the original document. Records with a large proportion of errors and illegible passages have been checked word for word[39], in some cases under ultra-violet light at the Public Record Office.

The final checks undertaken consist of listing details from the database in various orders to ensure that the books are complete and correct, beginning with all the entries in order of their identification number. Examination of the sequence of numbers and checking the number and boat for the entry at the bottom of each page ensures that none has been omitted. Minor errors may become apparent in the course of analysis, and a register is kept of suspect entries to be corrected later. Further checking will always bear fruit in a database with 38,000 records.

Such checks have been carried out for all the Port Books utilised in this study, and by 1992 are expected to be complete for the whole database[40]. These rigorous methods of checking and transcription provide a sound foundation for the analysis and interpretation contained in this study and for the continuing uses of the source.

iii. Computer-aided analysis

This section discusses the methods of analysing the Portbooks Database developed for this thesis. Many of these methods must be laid out in some detail not only because they form the foundations for the findings of the thesis, but also because they may provide models for investigation of the database in future. The section also outlines the strategy used to sample a volume of data which could be entered, checked and analysed for use in the study within the timescale of registration for a higher degree.

Most historians working with Port Books have used complete years as samples of the records. The dangers of this are exemplified by Willan's misinterpretation of changing standards of recording as a decline in trade; a mistake that was made possible by his use of widely dispersed sample years. A principal hazard of using sample time-periods, then, is that the process of change in the records cannot be observed and is liable to misinterpretation. Another important danger is that short-term fluctuations may be interpreted as long-term changes. One period cannot be taken as representative of a longer one without both caution and supporting evidence. However, sampling complete years is in many ways the most sympathetic to the

records, in that the coverage is temporally based. The Port Books were compiled for complete years or half years, and the frequent gaps in all Port Books series mean that continuous use of the data is impossible. Even study of the completed database would have to be annually-based to take account of the loss of many half years and the absence of records for some long periods, which would bias findings from the database as a whole towards the best-represented periods and seasons.

Other methods of sampling were considered for this study, including random sampling and stratified sampling. The former is the process of selecting a sample completely at random, usually with the aid of random number tables. The latter is the selection of records on a similar random principle but with care taken to ensure that certain characteristics of the total population are proportionally represented: for example to ensure that the same proportion of records relating to boats of each port was in the sample as in the population as a whole[41]. However both random and stratified sampling have drawbacks. Both are unsuitable for certain kinds of analysis, such as the recognition of patterns in the sequential voyages of individual vessels, the measurement of seasonality, or the analysis of phenomena too infrequent to produce a statistically significant number of occurrences within a random sample[42]. Studies such as these require the integrity of a comprehensive source, albeit for a closely delimited period. Another problem is that random sampling would inevitably be more representative of periods for which many Port Books survive than those when there are few. With changes of an important nature occurring over the whole period studied both in the nature of trade and the extent of its recording, the question would also arise over randomly sampled data, to what period or periods would the results refer? Finally, both random and stratified sampling of the Port Books would be extremely difficult to accomplish. They would require either the transcription of selected individual entries, creating chaos for later transcription of the whole source, or the source to be already computerised, in which case sampling would be redundant. Stratified sampling would require selection of data representative in proportion to particular variables, such as the number of entries for each home port, or the number with each merchant or each commodity; but for a source with so many variables, compiling a base of knowledge to assess this would be a task almost as large as comprehensive transcription.

The selection of complete years has been identified as the most appropriate method of sampling for this study. The dangers of bias from short-term fluctuations or of misinterpreting the process of change have been lessened by the frequency of samples, and the use for certain analysis of both a five-year continuous sample and the remainder of the uncorrected database. The books sampled are listed in Table 2.2.

Table 2.2

Port Books Sampled for the Study

Year	Book(s)	no of entries	part-illeg entrs	illeg atbts
Decadal samples				
1637	1248/10	267	46	87
1647	1248/14	197	Nil	Nil
1656 7	1249/02*	356	2	2
1666	1249/04	445	35	74
1674	1249/10	337	Nil	Nil
1684	1251/01	515	6	8
1697	1252/17	634	22	34
	1253/03			
1705	1254/10	641	27	95
	1255/05			
1715	1258/04	658	Nil	Nil
	1258/05			
1722	1259/10	711	11	18
	1260/04			
1733	1263/10	379	4	12
	1263/12			
1741/2**	1264/13	391	4	6
	1264/10			
1752	1265/09	350	Nil	Nil
	1265/10			
1765	1269/01	246	Nil	Nil
	1269/05			
Five years				
1704	1254/07	610	13	36
	1254/09			
1705	1254/10	see above		
	1255/05			
1706	1255/01	622	3	5
	1255/07			
1707	1255/08	675	14	19
	1255/14			
1708	1255/11	704	Nil	Nil
	1256/01			
Year for comparison with Bristol and Chepstow				
1699	1253/06	664	33	63
	1253/09			
GLOUCESTER SAMPLE = 9,402 records				
Bristol books				
1699	1157/03	504	6	10
	1158/02			
Chepstow books				
1699	1285/02	410	4	4
	1285/13			
TOTAL SAMPLE = 10,316 records				

* Part of book used only: year from 26 March.
** June 1741 to June 1742.

In all, 19 years have been comprehensively computerised for this study from the Gloucester series, amounting to 32 books. The sample contains 9,402 records, representing 28% of the extant records for the period studied (and 25% of the whole series from 1581 to 1765)[43]. At least one year has been selected for every decade during the period studied, providing a regularity which permits major changes in recording quality to be perceived. Regular sample years could not have been taken more frequently even if a larger sample had been practicable, owing to the fact that there are several lengthy gaps, and four decades in which only one complete year survives[44]. All surviving books from the period studied are listed in Table 1.1.

The continuous five-year sample for 1704-8 provides a control to assess the likely extent of annual variations and permit certain figures to be compiled in terms of a five-year mean. It also permits some longitudinal studies to be undertaken which could not be satisfied by smaller-scale or random sampling. Some searches with illustrative and comparative rather than quantitative purposes have been made over the database as a whole, in its uncorrected form. Use has also been made of the complete series on microfilm, particularly in developing an understanding of the methods by which the Port Books were kept.

In addition to these samples, four Port Books for Chepstow and Bristol in 1699 have been computerised for comparative purposes, making a total sample of 10,316 records. Six Overseas Port Books for Gloucester have been transcribed to ensure an understanding of the coastal data within the context of the maritime trade of Gloucester as a whole. These record a negligible volume of overseas trade[45].

The number of entries in each of the 36 books computerised is listed in table 2.2. Until 1690 each book corresponded with a single year, but after this date there were two books a year[46]. Each sample is formed of entries from 12 months contiguously, but none begins on 1 January. Nearly all are from Christmas to Christmas, so that references in the text to 1697 refer to records between 25 December 1696 and 24 December 1697. The exceptions to this are two years for which continuous data over twelve months is only available from a different part of the year. For the 1740s, the only two contiguous books which can be used run from June 1741 to June 1742. The only available Port Book for the 1650s runs, exceptionally, from 26 March 1656 to 29 September 1657, so entries from March to March have been sampled. Unfortunately, no outward voyages are recorded in this book[47].

Care has been taken to avoid years compromised by a high level of illegibility, or, if possible, by times of exceptional disturbance to trade. The volume of data which remains illegible in the samples has been quantified in Table 2.2, showing for each book the number of entries which are partially illegible and the number of

attributes which cannot be deciphered. Even in the worst sample years less than 100 attributes are illegible out of several hundred lengthy entries. In the rare circumstances where these may appreciably affect the interpretation of the records, this is discussed.

Techniques for the analysis of the database have had to be devised for this study as the first of its kind. Many of the methods developed are quite simple, others technically complex. In many cases the approaches have been experimental, not only testing the use of the technology but also exploring the patterns presented by sorting and selecting the data in diverse ways. In some cases the results have been uninformative, and in others unexpectedly revealing. The methods developed deserve discussion in some depth in order to suggest directions for future analysis of Port Books databases.

Another important reason for describing in detail the methods of analysis used is that they have required various assumptions to be made in order to manipulate the data informatively. Historians have always had to make assumptions about their data, and their training in the propriety of such assumptions has been one of the cornerstones of scholarship. However, few historians have found it necessary to account in detail for the minutiae of their craft: how they transcribed their sources, how they treated illegible data, exactly how they grouped data in order to synthesise it, how they converted measures, how they linked and differentiated references which might be to the same person, or which data they included and which they excluded from their analysis[48]. Yet all these minutiae are essential in modern quantitative history, especially in the age of computerisation and data exchange, and there is increasing interest in agreeing common methods, particularly in disciplines such as historical computing, historical psephology, demography, and prosopography[49]. The potential for comparative and consecutive studies to build on one another's findings once masses of data are computerised is almost revolutionary in its implications, but it can only be realised if the basis of each study can be understood and replicated[50]. This is especially important if the same databases, or others using comparable sources, are to be used by several different scholars to compare results.

The assumptions made in this study are therefore described both because they offer solutions to interpretive problems of the Port Books and because they have a material effect on the findings presented. Most are described at appropriate places in the text. Those relating to the interpretation of commodities and measures are described where the commodities are discussed in detail. More general assumptions are described in this chapter.

One of the most important uses of the Portbooks Database is the most simple technically, namely selecting entries for certain people, ports, boats or other attributes. This is important because it forms the basis for further analysis, and because it can be used to find groups of records for browsing in their entirety. This is a valuable way to become acquainted with the data in preparation for asking more structured questions. Selection of records for a particular port, for example, may indicate the typical cargoes on its boats and suggest particular commodities that should be examined systematically. Selection of all the records relating to one person as master or merchant may help to suggest how his career developed, perhaps changing from the role of master to merchant, operating more boats, extending his range of regular routes, and specialising in certain commodities. Selection of whole records can also provide detailed information when analysis of single variables in the wider samples has raised. For example, a table showing voyages per merchant over a period indicates a hiatus in the activities of the merchant Graffin Prankard. Examining full entries for all his voyages suggests reasons for this, showing that he operated with one boat before the gap and several afterwards, all of which had a different master. This reveals that after his bankruptcy his business stopped for a time, after which he changed from using his own boats to chartering[51].

Even this kind of simple selection of the data requires the development of methods and assumptions. In the case of searching for a particular merchant, the problem arises that his surname may have been spelled in many different ways. The solution has been the facility already mentioned of a separate look-up table of surnames which relates them to appropriate standards. A search specifying entries with the *standardised* surname 'Beale' will automatically search for its dozen alternative spellings. If this appears to cause any confusion or conflation, original spellings can be searched for instead.

Other kinds of searches, too, are for a variety of expressions of an attribute, not just one. The most common concern commodities. Since the original syntax of commodity descriptions is retained, several different phrases may refer to what might be the same for most purposes: for example 'English glass bottles', 'English made glass bottles', and 'glass bottles'. Also, commodities are often described with others, such as 'glass and bottles', or 'bottles and window glass'. In other examples a commodity may be given an ambiguous description, such as 'bottles', or 'glass and glassware', which may or may not have included the commodity being searched for. The methods of overcoming these difficulties are two-fold. First, the use of 'wild-cards' enables a string of characters to be searched for regardless of those on either side of it, so that a search for '...glass...' will find all commodity attributes containing

those five letters. Second, the maintenance of a database file of all commodity descriptions in the database allows a reconnaissance to be made of terms which should be searched for to reveal the items wanted. It is of enormous importance to any study of a particular commodity that this exercise is done accurately. Examples of selection of this kind are described in the chapters below on tobacco and salt. For tobacco, 15 different terms were searched for, but some phrases including the word 'tobacco' had to be excluded because they referred not to the principle commodity but to goods such as 'tobacco stems' or 'engines to press tobacco'. These are laborious methods; but in the longer term highly tuned classifications of the terms should make access easier.

Searches may also specify ranges of values rather than specific characters. The most obvious application for this is in searching for numerical values or dates. For example, it is possible to search for all entries with certain characteristics over a range of dates. A similar technique can select just the largest shipments of specified commodities to examine who was carrying them (for instance extracting entries with the commodity tobacco, the measure lbs and a quantity greater than 2,000).

Searches like this produce large volumes of data to be assessed, and it is important to be able to screen them further and order them. One way of reducing the volume of data to be examined is to restrict the information displayed to certain desired attributes rather than the whole of selected records. An investigation of particular commodities, for example, can display the essential attributes of the voyages and the desired cargo but suppress all the other items carried. This kind of selection is essential for calculating quantities of the commodity shipped. Other searches, too, are often easier if the number of displayed variables is kept to a minimum. For example an examination of the pattern of voyages made by a vessel will most usefully be based on the displayed attributes of boat, merchant's and master's Christian and surnames, date and destination. It is helpful if information is also sorted. A printout like this might most usefully be sorted by direction of voyage and then by date. Selected data can be sorted alphabetically or numerically by any attributes they contain. This assists the user to perceive patterns and makes it easier to use voluminous printouts.

Much of the analysis for this thesis is concerned with extracting numerical data from the database. This is essentially a process of imposing rational patterns onto the data: defining what is to be counted and finding ways of breaking down, aggregating or converting the results. The methods fall into two groups: those developed for counting occurrences, especially voyages, and those for quantitative analysis of commodity shipments.

The first thing that must be done to count voyages is to define them. Since the entities in the database are *entries* in the Port Books, adjustments are necessary to count *voyages* by identifying and excluding second entries for the same voyage. Surprisingly, previous scholars who have quantified voyages in Port Books seem to have assumed that entries equated with them. In this study, identification of voyages with two entries was undertaken by visually examining for each book a table showing boat, home port, master's surname, destination, and date for all entries, in their original order. Two entries close to one another which have all of these attributes in common must represent the same voyage. It appears that in the Gloucester Port Books there was only one circumstance in which a single voyage was given two entries[52], although this circumstance was common. This was when a vessel was carrying wool and other items of cargo. Wool was always given a separate coquet after sometime around 1690[53]. In many cases wool was the only cargo, in which case there was only one entry, but if there was more cargo a second entry was made. This makes an appreciable difference to findings from the source, especially in detailed analysis of people or ports who traded in wool a great deal.

When two entries relating to the same voyage have been found, the link between the two is signified in the Miscellanea field by writing 'REST 05/16' in the entry with the wool to signify in which entry the rest of the cargo can be found, and 'WOOL 05/15' in the entry with the remainder of the cargo. In order to avoid double counting in the analysis of voyages, those entries with Miscellanea fields containing the word 'REST' have been excluded from study wherever relevant. Indexes or 'select lists' are saved of the voyages for each sample year and analysis which is concerned to count voyages rather than entries uses these. The number of second coquets removed from each sample year is shown in the middle column of table 3.1. It is clear that the practice of giving second coquets in this way was initiated sometime between 1684 and 1697 and remained at a reasonably stable level of about 4-8% of the entries in the books. The number of second coquets listed in the Bristol books appears to have been smaller, and they do not seem to have been entered in the Chepstow books at all[54].

The techniques described to select particular records and sort them are prerequisites of any attempt to count voyages. A wide variety of selections and tabulations have been made to explore the trade through Gloucester. For example, voyages have been tabulated per month, per home port, per destination, per port of origin, per merchant and many other attributes. This has been done for each sample year, examining inwards and outwards voyages separately, for the five-year sample, and for pre-selected groups such as all voyages carrying particular commodities.

Some tabulations are by more than one criterion at a time, for example the numbers of voyages per merchant per port, or per destination per home port.

Once counts of records within particular groups have been made, these have been entered manually into a spreadsheet package in a re-organised form according to historically significant groupings of the data[55]. For example, the final tables of destinations show not the destinations stated in the Port Books but wider geographical regions (for example showing 15 voyages to south west Wales rather than one to Carmarthen, five to Haverfordwest, one to Laugharne, five to Tenby and three to Milford). This is necessary both so that patterns can be observed in more compact tables, and so that means and percentages will be significant, whereas they would not be for one or two voyages at a time[56]. The home ports of boats are classified likewise to break down the eighty or so mentioned into a manageable number for tabulation and discussion[57]. The groupings have not been used where they would subvert the purpose of investigations, for example in calculations of the numbers of merchants per port or goods traded only from a few specific locations.

In counting the number of merchants associated with each home port, the basis has been a sort of the data first by port, then by standardised merchant's surname, then by merchant's Christian name. In counting voyages of merchants, however, it is clear that some merchants operated from more than one home port, and although figures are collated port by port in an attempt to separate different people of the same name, the figures have been combined if there is reason to believe the merchant was the same.

Much interrogation of the Portbooks Database is concerned with particular commodities in detail, but it is also important to be able to take an overview of types of goods carried. For this purpose a classification of commodities has been designed which can be implemented automatically to count voyages containing certain groups of goods. This eight-fold classification is discussed in chapter 4[58]. Out of 3,079 commodities, all but 85 were satisfactorily classified.

The purpose of the exercise has been to calculate for any group of entries in the Port Books the proportion which included each class of commodities. For example, it is valuable to be able to gauge the proportion of voyages from Bewdley which included metals and extractive minerals so that the industrial nature of the port can be measured. With 3,000 commodities and eight classifications to be borne in mind, such analysis by manual methods would be virtually impossible. Manual experiments to undertake this task on even a dozen records at a time proved both time-consuming and unreliable. By the operation of a complex tailor-made programme, however, the computer is able to conduct such an operation rapidly on any volume of data[59]. The programme counts entries containing commodities of a

specified class by reference to a separate data file of the commodities with classifications. Where an item in the main database fits the classification, the record is counted and the search moves on to the next record[60]. The end result is a count of the number of entries containing one or more goods of the given class, and a calculation of the percentage of the records searched which this represents: for example showing that in 1699, 77 recorded outward voyages by Bewdley boats carried metals, and that this represented 92% of all voyages by Bewdley boats during the year. Information such as this can be provided for any selected group of records.

The development of the methods will enable further applications of a similar nature to be tried in future, both manipulating the data in different ways and utilising much more complex classifications designed according to a variety of principles.

An attempt has also been made to develop automatically generated graphs and maps. Unfortunately, difficulties have limited the scope for their use in this thesis. It is important in dealing with large volumes of numerical data to be able to interpret it visually. Two needs were perceived: to graph change over time in some of the vital statistics of river trade, and to map relations of ports with one another. A spreadsheet package was used to store, analyse and export numerical data to tailor-made programmes[61]. In the longer term, the needs for graphic tools having been defined, it will be possible to develop direct graphic output from the database.

The main difficulty is in the expression of a large number of variables on either a map or a graph. Most tables of data produced for this thesis have far too many variables, yet are themselves simplifications. Further grouping of the data has been necessary in most cases for the lines on a graph or mini-histograms on a map to be legible. Results have also proved unsatisfactory in the quality of the image produced with, for example, line styles on the graphs being difficult to tell apart[62]. For the maps, software problems prevented the use of scaled pi-diagrams and instead forced the use of mini histograms. Whilst pi diagrams would have expressed by their size the number of voyages from each home port and by their divisions the number to each destination, histograms can only demonstrate the latter[63].

Such troubles are by no means unusual among projects attempting statistical mapping by computer[64]. As a result of them, graphs and maps have been reserved to show small numbers of variables and clear patterns. Given more development, improved techniques may be applicable directly to the database, so that they can become tools of experiment rather than just expression[65].

Quantitative study of individual commodities has required the development of further new methods. Numbers of voyages with particular commodities have been counted to

indicate the quantity and proportion of voyages which included the items in question. However analysis of the actual quantities of a commodity carried is more difficult. The question arises whether to examine weight, volume, or value. None of these measures is completely satisfactory, and each would suggest different interpretations of changes over time. For example, numbers of shipments do not increase at the same rate as tonnage if the mean cargo size of vessels is growing; tonnage carried could grow while numbers of shipments fell if boat sizes were growing markedly. Weight is one of the most widely-used measures of trade in historical research and contemporary studies of trade, yet a ton of coal or a ton of iron are not remotely comparable with a ton of woollen cloth or best imported brandy in terms of the economics of their transport. Volume is problematic for exactly the same reasons as weight. Value, too, though widely used, is an unreliable guide, as total values of goods shipped increase much more than tonnage if there is general inflation, a marked shift in prices for a particular commodity, or temporary dearth. All of these measures might also be expressed in more complex ways, for instance not tons carried but ton/miles to express the amount of carrying activity in a more meaningful way.

The Port Books impose some limitations on the types of measurement of commodities which are valid. The difficulties of converting weights and measures to a single form are considerable even for a few chosen commodities. The task of measuring the total trade of the river by weight, although attractive, would be a huge one, owing to the large number of commodities and measures, and the fact that measures had different weight equivalents depending on the commodity. The Port Books contain about 15,000 concordances of commodity and measure (or equations which would have to be solved in order to convert to a single unit). Conversion would also have to take into account that customary measures varied over time and between places. However, with work over a long period, the development of look-up tables similar to those used for classifying commodities and standardising surnames might make it possible to provide estimates of total tonnage. Conversions to calculate values of goods are even more problematic, since no price series are currently available for more than a few of the commodities carried, and prices varied from place to place and month to month. Effective measurement of trade by value must await further research in other areas of economic history[66].

In this thesis commodities have been quantified in the most common unit used to measure them in the documents. Converting to a single measure where possible is very important, as it allows comparisons to be drawn and the evidence to be interpreted much more readily. One of the barriers to understanding much of the history of trade that has been written is that conversions of this sort have rarely been

made. Willan, for example, when discussing quantities of goods shipped coastally, typically referred to a confusing range of measures with no suggestion of their relative sizes[67]. However, some scholars have attempted to convert measures to single indices[68], and it is regarded here as essential if patterns of trade are to be perceived.

For this study, tables of commodity descriptions have been ordered by the unit of measure used, and the values have been converted manually before entering the data into a spreadsheet. The equations devised for the conversions are stated where relevant in the text and footnotes, and take into account variations between commodities, and sometimes also places. Equivalents have been estimated from Zupko's *Dictionary of Weights and Measures*, contemporary sources, secondary publications, and internal evidence from the Port Books. In a few cases, the measures used in the Port Books are so imprecise that only a guess is possible, for example what is the weight of a bundle of twigs or a pack of wool cards? However for many commodities, including those selected, these problems are rare, and do not greatly affect the final calculations. The unit of measure most commonly used in the Port Books for the commodity in question has been used so that the cumulative effects of inaccuracies are minimised. The two commodities given detailed consideration in separate chapters, tobacco and salt, have been chosen partly because the reasonably standard units of 'lbs' and 'bushels' respectively were almost ubiquitously used. They are not comparable with one another directly because the former is a weight measurement, the latter volumetric; but these are most appropriate for comparisons within the particular commodity trade. For some commodities, accurate measurement might be much more hazardous because irregular measures like the 'truss' or the 'parcel' were used, or because the commodity was often combined with others in phrases such as '2 pack 3 truss linen woollen Manchester and haberdashery'.

The small proportion of illegible attributes remaining in the records have had to be dealt with in compiling numerical data in such a way as to avoid distortion. In most cases it has been possible to state the number of voyages for which a crucial attribute is not known. Thus, in tables which show destinations of voyages, for example, one column shows 'unknown' destinations, including those which were illegible or not given. In fact, few of the illegible attributes in table 2.2 have an effect on most searches. Most relate to unimportant attributes such as the marginal mark or the second date. In the case of the cargo, it is true that an illegible commodity which happened to be particularly rare might materially affect figures for that subject. However the proportion of illegible commodities to the total number makes the probability of damaging errors extremely low. Where a commodity is legible but the quantity or measure attributes are illegible, calculations take account of this by

assuming the missing value to have been the mean value in voyages from that home port. This provides a more acceptable value than would omitting the occurrence and thereby counting it as nil.

iv. Critique

The development of a system for the computerisation and analysis of the Gloucester Port Books has been the principal focus of this study. The database created has important implications for the uses of Port Books in general and will provide a permanent resource for continuing research into the trade of the Severn.

The methods of computer-aided study used have been primitive and labour-intensive by comparison with those which will succeed them. However they have been revolutionary by comparison with traditional historical methods for the study of Port Books. A database has been designed which incorporates the whole of the documents and permits them to be examined with subtlety and sensitivity to their meaning. This has allowed many more and more varied questions to be asked of the Port Books, with much larger samples and a higher degree of accuracy, than would have been possible by manual means. For the first time, methods of analysis can be made explicit, and the whole source made readily accessible, resulting in findings which other scholars will be able to verify, to develop, or to replicate for other ports.

The design of the Port Books database provides an effective model for the computerisation of the source. However some variations from it are to be recommended. The most important improvement in future databases would be to adopt original spellings for all attributes. In this first database, original spellings have been used for surnames, and other attributes have been standardised little, but the increasing speed of processors means now that the use of look-up tables is practicable for all original variants of spelling and all attributes. Whilst the minor standardisations approved do not hamper the use of the database, distinctions have been lost because volunteer transcribers were used to standardising spellings and so transcribed less faithfully. For example, though both 'brick' and 'bricks' could be transcribed as in the original, volunteers tended to write only one form or other[69]. Such problems are not widespread, but impede studies of a few goods. Another improvement would be to identify as separate attributes some of the types of information currently placed in the Miscellanea field, where they cannot be utilised to maximum effect. As most have been written in standard forms it will be possible automatically to separate them into new fields[70]. Thirdly, interpretational comments

could usefully be added to records where the source is deficient, for example if the clerk made an obvious error or if an illegible value can be guessed; and finally, the development of direct graphic output from the database would greatly enhance the potential for experimenting with and exploring the data.

These deficiencies can be corrected within the broad data model and system type already developed, with its efficiency and simplicity of use. However they might also be corrected by the use of a text mark-up system adopting the same data model but with the additional freedoms that text allows. Both systems would be compatible for most purposes.

The approaches to computer-aided analysis developed also provide models upon which future investigations may be based. These have evolved as a result of numerous experimental manipulations of the data and attempts to solve problems of interpretation and analysis encountered. The volume of data and the potential for re-structuring and analysing it which result from computerisation give a bewildering new freedom for research. Out of the opportunities created, tested techniques and beneficial approaches to the comprehension of the data must continue to be developed.

The enormity of devising, creating and checking historical databases and developing methods for their analysis is such that their creators may, in the phrase of Bertrand Russell, be forever cleaning their spectacles without ever looking through them. The following chapters take some views through the Gloucester Portbooks Database to the prospects of the past that can be revealed.

CHAPTER 3.

PATTERNS OF RIVER TRADE

The purpose of this chapter is to describe and analyse the geographical patterns of traffic on the River Severn as it was recorded at the Port of Gloucester. It quantifies the voyages inwards and outwards as they changed over time, examines the relative prominence in the trade of different 'home' ports, assesses Gloucester's relations with the coasts beyond, and identifies patterns in the fluctuations of traffic movements. More detailed examination is made in succeeding chapters of the patterns of trade as they related to the goods and commodities carried, and the development of trade in particular commodities.

Patterns of traffic on the Severn were composed of innumerable individual voyages with different characteristics, not regular journeys from one end of the navigation to the other. Traffic passed in different directions, not only up and down the river, but along the south Wales coast, to the south-west peninsula, the Severn estuary, and occasionally further afield. The distances of journeys varied as a function of not only the places communicated with beyond the mouth of the river, but also the ports of the river above Gloucester. Aggregate patterns of trade changed over time: adapting and developing with changes in the economy and resource exploitation, and fluctuating according to changes of the seasons, periodic obstacles or encouragements to trade, and the rise and fall of the tides.

With such complexity, it may indeed be expecting too much to define overall patterns. There were some principal themes, for example that throughout the period Bristol was by far the major destination for down-river traffic, or that departures from Gloucester were clustered around the spring tides; but these emerged from a confusion of exceptions and contradictions. The merchants and masters of the seventeenth and eighteenth centuries responded to needs for transport and trade that it was economic for them to answer (and, if they were like trading people today, also to some that were uneconomic). They did not always take up all the opportunities available to them. They acted in part according to tradition and instinct. They did not conform to any plan dictating the patterns of trade.

It is important to find methods to synthesise this diversity so that it can be understood. This can best be done by examining the voyages that were made,

according to several different principles of analysis. One can analyse the traffic by 'home' ports, by destinations, by year, by months of the year, by merchant, or by any number of different characteristics and combinations of characteristics. However no single index gives a complete understanding of the real richness and diversity of trading activity. If trade is thought of as an undulating three-dimensional landscape, as an analogy, it is clearly impossible to give any single quantitative or qualitative summary of the landscape as a whole. What can be done is to take numerous sections through it, each of which will give a different but equally valid profile, and to describe some of its individual characteristics. A range of approaches is needed in order to describe or to explore the hidden patterns contained within the subject.

Most historians have solved or evaded this ontological problem of summarising a complex phenomenon, by selecting a small number of observable themes within trade patterns. Thus Williams in his work on King's Lynn divided his description of trade into the coastal and the overseas, and then discussed the broad destinations of trade in the most important commodities[1]. He commented on differentiated patterns relating to the seasons, persons or destinations only in so far as they were revealed within this schema. His approach and that of other historians has therefore naturally been led by pre-conceptions of principal factors in the trading patterns, and did not explore the available data empirically to find whether other patterns emerged. To do otherwise with manual methods would not have been feasible, and to explore the data utterly comprehensively would be impossible even with the aid of a computer. Similar approaches of breaking trade down into themes which can be described has been used in almost all studies of trade based on quantitative evidence. No historian or historical geographer has attempted to define or analyse trade in terms of more than a few systematic measures of the trade as a whole. Jackson in studying eighteenth-century Hull broke down traffic into the overseas and the coastal and then analysed the latter in terms of changing tonnages belonging to the port and comparisons with others, tonnages inwards and outwards, and numbers of voyages communicating with its different trading partners[2]. More ingenious individual measures have been used: for example the distribution of tonnages of trade in and out of British ports and their ratios to the tonnages for particular goods going there[3], or the flows of trade along turnpike routes expressed in terms of money collected in tolls[4]. A recent paper by Dyer has assessed medieval trade in terms of interaction of social and urban hierarchies[5].

No system of summarising trade patterns is entirely satisfactory, The most useful approach, perhaps, is to take a series of viewpoints and to see what is apparent from them. The remainder of this chapter selects some principal viewpoints for consideration and explores change in each of them over time. In particular it addresses

the total volume of trade; the ratio of inward to outward trade; the numbers of voyages from the different 'home' ports; the destinations and origins of trade beyond Gloucester; the relations between 'home' ports and particular destinations; and the fluctuations of trade from year to year and season to season. Discussion in the text addresses the principal themes arising from each analysis, and the summarised data is presented in tables and figures.

i. The volume of traffic

Even a descriptor of trade so apparently clear as its total volume presents significant problems of analysis. Some of the difficulties of deciding upon an appropriate unit of trade for measurement have been discussed in Chapter 2. Briefly, any measure gives an incomplete view of trade and suggests a subtly different understanding, whether it be number of coquets, number of voyages, tons carried, value of goods carried, miles travelled or ton/miles. In this chapter, numbers of voyages alone are dealt with, so that an understanding of *traffic* can be gained, upon which a knowledge of *trade* in goods and commodities can be built in the subsequent chapters.

Counting voyages requires decisions about how to separate *entries* in the Port Books from *voyages* made, although previous historians using Port Books do not seem to have addressed this distinction. The methods have been described in Chapter 2 for separating second coquets for some individual voyages. Table 3.1 shows the numbers of coquets and second coquets for each sample year, together with the adjusted figure representing voyages.

The variations in recording discussed in Chapter 1 must be borne in mind in examining Table 3.1. It should be noted that all the Port Books before about 1660 seem to have recorded a smaller proportion of voyages, with the exception of the year 1656. This was more detailed than any other book in the series, even though it contained inwards voyages only. If outward voyages were added, the total might be about 6-700[6]. Clearly, this figure is not compatible with the other sample years, representing as many voyages again as even the a largest of them two generations later, by which time it is known that many trades had grown considerably. The figures after about 1725 are also not compatible, as the proportion of traffic recorded has been shown to have declined markedly[7].

With these dangers of under-recording taken into account, the figures of voyages from the Port Books give a valuable insight into changes in the volume of long-distance traffic on the Severn in the period. The total number of inward and outward voyages recorded grew from 267 in 1637 to 445 in 1666, and 678 in 1722

Table 3.1

Numbers of recorded coquets, second coquets and voyages for all sample years

Year	Coquets	Second Coquets	Voyages
1637	267	0	267
1647	197	0	197
1656	356	0	356
1666	445	0	445
1674	337	0	337
1684	515	0	515
1697	634	42	592
1699	664	38	626
1704	610	27	583
1705	641	33	608
1706	622	38	584
1707	675	44	631
1708	704	38	666
1715	658	43	615
1722	711	33	678
1733	379	24	355
1741	391	17	374
1752	350	28	322
1765	246	9	237
Total	9402		8988
CHP16	410	0	410
BRS16	504	13	491
	10316		9889

before falling with the decline in recording to only 237 by the end of the series in 1765. Even between 1666 and 1722, when recording seems to have been similarly thorough, there was a greater than 50% increase in numbers of recorded voyages. This is an impressive rate of growth and suggests that important expansion was taking place in economic activities in the region and in internal trade.

Taking the longer series of records, these figures indicate growth during the seventeenth century, though with some marked set-backs. The most notable of these is 1647, when damage done during the Civil War seems to have had a great impact on trade. There was another serious set-back to growth in 1674, when trade was depressed and still affected by the war with Holland that ended in that year[8]. In the last two decades of the seventeenth century, the growth in trade seems to have been rapid, from 515 voyages in 1684 to 626 in 1699. Trade then seems to have maintained a reasonably stable level through the first half of the eighteenth century, experiencing some slight growth overall by 1722.

It is not possible to estimate comparable totals for the years 1733 to 1765, but individual commodities which were accurately recorded and contemporary descriptions of trade indicate strongly that overall trade was continuing to grow at a rapid rate, and perhaps accelerating[9]. This directly contradicts Willan's erroneous assertions from Port Book evidence nationally that there was a decline in trade after the 1720s, as discussed in Chapter 1[10].

It is worth attempting to make some estimate of the total traffic passing through Gloucester, as opposed to simply that which was being recorded, however approximate this may be. Clearly, it is not appropriate to include in such an estimate the trade in the parts of the river above Gloucester, the mainstay of which was coal the vast majority of which must have been sold to markets between Coalbrookdale and Tewkesbury. However trade which passed by the quay at Gloucester was also under-recorded, as was discussed in Chapter 1. The figure for 1656 may provide some index to the real traffic which passed through the Port of Gloucester as a whole, since it recorded let passes from other ports and many voyages in which the later Port Books seem not to have taken an interest. If so, then the other figures for total shipments should be increased substantially. 1656 saw twice as many upstream voyages as did 1666, in which there was a standard of recording broadly comparable with the a long run of the books. If an estimate is to be made for the early eighteenth century, the base to start from is approximately 400 downstream and 250 upstream voyages a year. The upstream voyages can be doubled to 500 in the light of the evidence from the Coast Book. The downstream voyages may not have been so far under-recorded, as when evidence is

available of let passes in the early eighteenth century, it seems they were issued at other ports but not Gloucester; but the 1656 books have been shown not only record let passes but a wider range of commodities and voyages that were not normally treated within the system[11]. The downstream total might therefore be increased by, say, half, to 600 voyages. This broadly balances upstream shipments and allows for the fact that vessels must often have returned empty[12]. Evidence from the 1656 book therefore suggests that a comparable rate of recording in the early eighteenth century might have revealed some 1100 voyages per year. To this figure can be added only the most general estimates of boats sailing between the upper river and the creeks within the head port, such as Newnham and Berkeley, since none of these is recorded in the 1656 book or any other. The main traffic omitted was the trade in iron to and from the ports of Newnham, Lydney and Ashelworth, *which there is evidence to suggest amounted to* perhaps 1,000 tons a year in around 1705[13], and might have represented perhaps another 30 voyages a year. Other goods carried over the same route or to and from the eastern bank of the estuary might have amounted to as many voyages again.

As a rough minimum, therefore, it seems that the number of laden voyages passing Gloucester quay each year may have been about 1150, or about 22 voyages a week. This may not seem particularly busy, but compares favourably with other estimates of traffic in the period. At about this time, the whole county of Gloucester had only 14.5 road carrying services per week from London, and these were in much smaller units[14]. A waggon of the period is estimated to have carried about one ton, compared with a vessel on the Severn, which carried perhaps an average of 35 tons at this date. Long-distance road carrying services serving the whole country to and from London at this time consisted of only about 450 services a week, carrying perhaps 800 tons[15]. The river trade through Gloucester was therefore approximately equal in weight to all the long-distance road traffic from the capital. Comparison with the coasting trade is not so favourable, but still indicates that Gloucester had a thriving river traffic. In 1728 even London, then the busiest port in the world, received less than 7,000 incoming voyages, or perhaps eleven times as many coastal voyages as passed *out* of Gloucester[16], though the capacity of the vessels was much larger.

ii. The directions of traffic

Table 3.2 shows the voyages recorded in the Gloucester Port Books divided between those in and those out of the port for all the sample years in this survey, together with the outward voyages expressed as a percentage of the total. This shows that in almost all years outward voyages were in a significant majority of those recorded. The high

Table 3.2

Recorded voyages inwards and outwards, for all sample years

Year	Voyages	Outward	% Out	Inward
1637	267	184	69	83
1647	197	131	66	66
1656	356	0	0	356
1666	445	259	58	186
1674	337	208	62	129
1684	515	252	49	263
1697	592	357	60	235
1699	626	332	53	294
1704	583	331	57	252
1705	608	343	56	265
1706	584	331	57	253
1707	*631*	*386*	*61*	*245*
1708	666	394	59	272
1715	615	390	63	225
1722	678	407	60	271
1733	355	285	80	70
1741	374	297	79	77
1752	322	257	80	65
1765	237	152	64	85
Total	8988	5296		3692

percentages for 1733 and later should not be regarded as significant, as it is clear that the reduction in the recording of voyages from Bristol and Chepstow was much greater for inward than for outward trade. Shipments from more distant ports into Gloucester, which do not seem to have been affected, suggest that the proportion of inward to outward shipments probably remained approximately static from 1722 to 1765 despite the change in recording.

Although there were variations in the share held by outward voyages compared with the total, a representative mean can be calculated[17] of 60%, and the variations from it were usually slight. It is impressive that the percentage share remained remarkably stable over the period as a whole, indicating no overwhelming shift in the economic relations of the upper river with the region below. The majority of recorded voyages was always outward, with the exception of 1684 when they fell to 49%. The reason for this may have been partly that some of the inward traffic was by let passes issued at other ports and not written into the Gloucester books, as discussed in Chapter 1. However it is likely that the figures represent a real, if smaller, surplus of outward over inward voyages. The products of the Severn valley region were, by and large, bulkier than the goods it imported, so that many vessels sailed back upstream below capacity, and others may have sailed back up the river in ballast or empty. As most voyages were to and from Bristol where there is no evidence that let passes were issued, it is all the more to be expected that the traffic 'surplus' downstream was a reality. Another reason for it may be that nearly all the merchants involved in the trade of the Severn were from the riverside ports. This must have made it more difficult for them to arrange return freight than outward. A few merchants placed agents at their destinations or were otherwise well connected, and it is clear from study of individual merchants' activities that some would usually bring upstream cargoes, while others could rarely get them. There were also some merchants and boats that made more upstream than downstream voyages, but on average over the period 1637 to 1722 there were 90 more recorded voyages per year outward than inward.

The stability of the proportion of outward to inward shipments suggests that the immense growth in the production within the Severn valley of bulky industrial materials such as clay, iron, coal, and also of many crafts and manufactures was balanced by expansion of upstream trade. The production of goods and commodities in the midlands advanced greatly at the end of the seventeenth century and in the eighteenth century, but this created an increased demand for many producer goods to come upstream such as pipe clay, copper and pig iron. The maintenance of the balance of trade may also indicate that demand for the kinds of more expensive consumer goods

which were brought up the river was promoted by economic success within the region. The variation between home ports in their balance of trade with the region below Gloucester was considerable, owing to their diverse economies. This is apparent in the patterns of voyages from each home port described in the next section, and in the classes of goods carried, which are addressed in Chapter 4.

iii. The home ports

As discussed in Chapter 1, the 'home' port referred to by the Customs officers in identifying vessels seems to have been the place from which vessels had set off on their outward journey. Whether or not this was the entire reasoning behind the port association, it can be shown that vessels usually departed from the places mentioned. The home port is therefore a principal characteristic of voyages on the Severn which deserves study. It can give clues to the relative importance of the different ports along the river in terms of the longer-distance trade, and it suggests the actual start and end points of trade by water. Unfortunately, the home port was omitted from entries in the Gloucester Port Books after about 1725. Analysis of home port patterns can therefore not be carried out for years after 1725. This change was already beginning to come about in the sample books for 1722, in which 12% of outward entries recorded no home port.

For the purposes of summary, the tables in this section are based upon geographical groupings of some of the less significant ports which are used alongside discrete figures for some of the more important places. As some 80 different ports appear in the Port Books in the sample years studied, this simplification is necessary for patterns to be observed in compact tables. It also allows means and percentages to be calculated, whereas this would not be appropriate for just one or two voyages to rare ports. The same geographical groupings are used throughout the remainder of this thesis, and are defined in the Table 3.3. They are also shown in map form in Figure 3.1.

Table 3.4 shows for all sample years the numbers of recorded voyages downstream from each home port or port group, together with the percentage that they represented of downstream voyages as a whole. Table 3.5 shows the same information for upstream voyages.

The tables show clearly the ports that were most important in the trade of the river as it was recorded through Gloucester: namely Bewdley, Worcester and Tewkesbury. These places featured significantly throughout the period studied in both inward and outward trade. No home port, however, ever obtained a majority of the trade carried.

Table 3.3
Port groupings used in the Tables

RIVER PORTS, NORTH TO SOUTH

1. **Shrewsbury and above**
   - Montgomery
   - Salop
2. **Severn Gorge**
   - Buildwas
   - Benthall
   - Broseley
   - Madeley
3. **Bridgnorth**
4. **Bewdley**
5. **Worcester**
6. **Evesham**
   - Stratford
   - Evesham
7. **Upton and Tewkesbury**
   - Upton
   - Tirley
   - Tewkesbury
8. **Gloucester**
   - Gloucester
   - Minsterworth
   - Elmore
9. **Estuary**
   - Westbury
   - Newnham
   - Framilode
   - Frampton
   - Awre
   - Gatcombe
   - Lydney
   - Berkeley
   - Woolaston
   - The Forest
   - Thornbury
   - Portbury
10. **Wye**
    - Hereford
    - Ross
    - Monmouth
    - Redbrook
    - Brockweir
    - Tintern — Abbey Tintern — Abbey
    - Wye
    - Chepstow

BRISTOL CHANNEL, EAST TO WEST

11. **South Wales**
    - Coggan Pill
    - Newport
    - Caerlyon
    - Oaklion
    - Cardiff
    - Aberthaw
    - Ogmore
    - Newton
    - Neath
    - Swansea
    - Llanelli
    - North Burry
12. **South West Wales**
    - Carmarthen
    - Laugharne
    - Tenby
    - Pembroke
    - Haverfordwest
    - Milford
    - Broad Oak
13. **Bristol**
14. **Somerset**
    - Bridgwater
    - Watchet
    - Minehead
15. **North Devon and Cornwall**
    - Lynmouth
    - Ilfracombe — Combe
    - Barnstaple
    - Bideford
    - Northam
    - Boscastle
    - Padstow
16. **Inter-regional**
    Several destinations are sometimes given for a single voyage. Where these are all within one region they are placed above as appropriate. Where they cross between regions, for example 'Bristol, Newport and Bridgwater', they are placed in this group.

OTHERS

17. **Others**
    - Liverpool
    - London
    - Chester — Westchester
    - Rye
    - Aberdovey
    - Aberystwyth
    - Caernarvon
    - Pwllheli
    - North Yarmouth
    - Lynn
    - Weymouth
    - Scilly
    - Illegible
    - Not stated
    - Unidentified

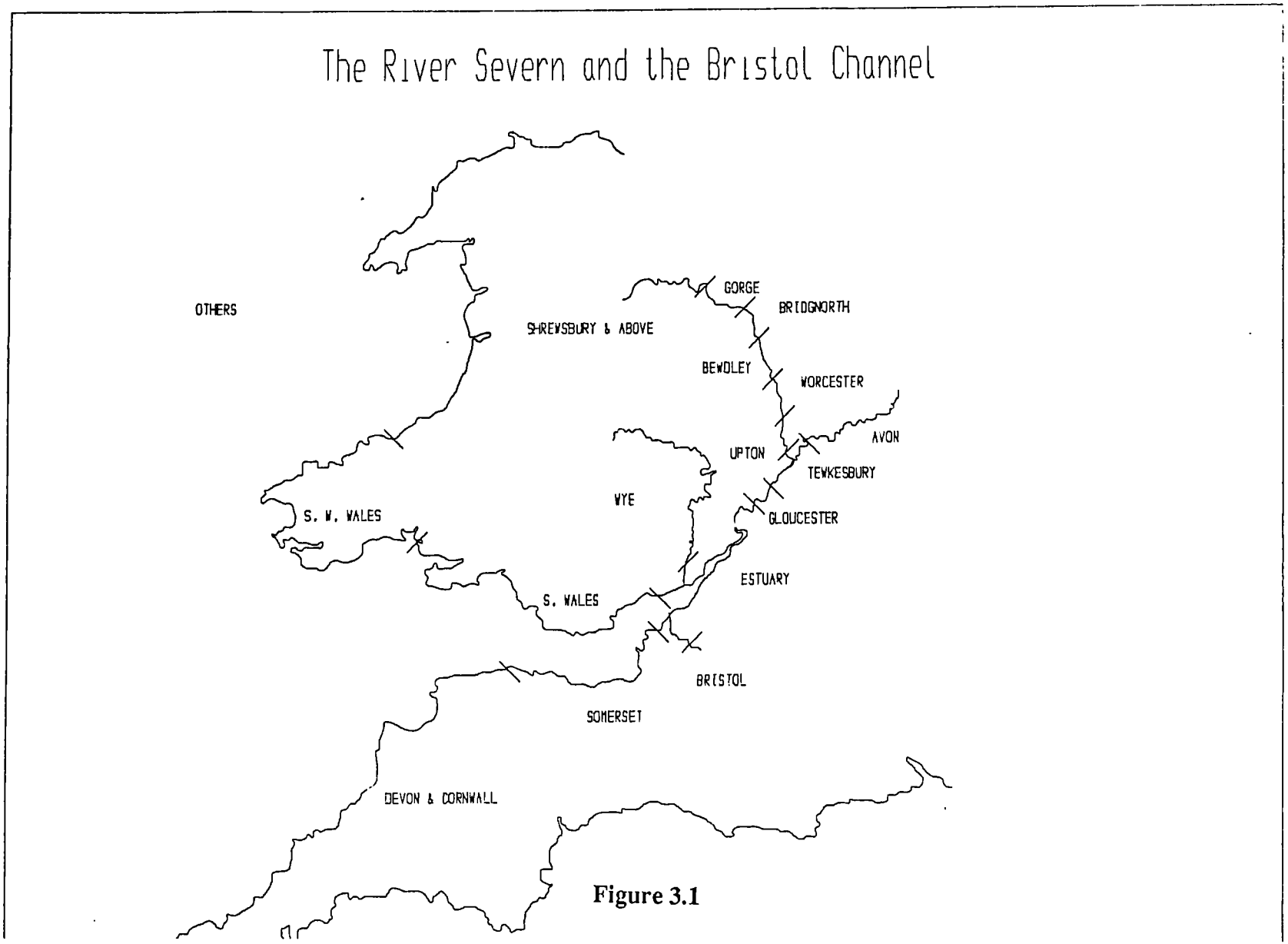

The River Severn and the Bristol Channel
OTHERS
SHREWSBURY & ABOVE
GORGE
BRIDGNORTH
BEWDLEY
WORCESTER
AVON
UPTON
TEWKESBURY
WYE
S. W. WALES
GLOUCESTER
ESTUARY
S. WALES
BRISTOL
SOMERSET
DEVON & CORNWALL

Figure 3.1

Number of voyages

	Shrewsbury	Gorge	Bridgnorth	Bewdley	Worcester	Avon	Upton	Tewkesbury	Gloucester	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Com	Others	TOTAL
1637	24	2	1	36	6	0	0	42	35	33	1	0	0	1	1	0	2	184
1647	11	0	0	25	7	0	0	54	19	6	1	0	3	1	0	4	0	131
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	14	3	2	82	37	0	14	62	6	30	7	0	0	2	0	0	0	259
1674	13	1	7	77	40	0	13	48	0	6	0	0	0	0	1	0	2	208
1684	3	1	11	74	59	12	21	46	11	13	0	1	0	0	0	0	0	252
1697	23	20	24	95	77	16	18	42	35	0	1	1	2	0	0	0	3	357
1699	27	7	22	84	84	14	10	39	43	0	1	0	1	0	0	0	0	332
1704	30	10	19	91	75	14	7	49	29	0	1	0	2	0	0	2	2	331
1705	24	4	23	93	71	10	6	45	22	34	2	0	5	1	1	1	1	343
1706	30	6	14	90	70	3	5	47	21	25	6	1	8	0	1	1	3	331
1707	31	5	8	90	105	7	8	45	33	18	17	0	16	0	0	1	2	386
1708	32	12	8	99	104	3	9	36	24	24	19	0	14	1	1	2	6	394
1715	17	3	8	114	88	4	16	63	51	5	14	0	5	2	0	0	0	390
1722	0	16	7	96	69	0	13	57	56	10	22	1	7	3	2	0	48	407
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	285	285
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	297	297
1752	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	255	255
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	152	152

Voyages as a percentage of the total

1637	13	1	1	20	3	0	0	23	19	2	1	0	0	1	1	0	0
1647	8	0	0	19	5	0	0	41	15	0	1	0	2	1	0	0	0
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	5	1	1	32	14	0	5	24	2	1	3	0	0	1	0	0	0
1674	6	0	3	37	19	0	6	23	0	0	0	0	0	0	0	0	0
1684	1	0	4	29	23	0	8	18	4	1	0	0	0	0	0	0	0
1697	6	6	7	27	22	0	5	12	10	0	0	0	1	0	0	0	0
1699	8	2	7	25	25	0	3	12	13	0	0	0	0	0	0	0	0
1704	9	3	6	27	23	0	2	15	9	0	0	0	1	0	0	0	0
1705	7	1	7	27	21	0	2	13	6	1	1	0	1	0	0	0	0
1706	9	2	4	27	21	0	2	14	6	1	2	0	2	0	0	0	0
1707	8	1	2	23	27	0	2	12	9	0	4	0	4	0	0	0	0
1708	8	3	2	25	26	0	2	9	6	1	5	0	4	0	0	0	0
1715	4	1	2	29	23	0	4	16	13	0	4	0	1	1	0	0	0
1722	0	4	2	24	17	0	3	14	14	0	5	0	2	1	0	0	1
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1752	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10

Table 3.4

Recorded downstream voyages, by home port, for all sample years

Number of voyages

	Shrewsbur	Gorge	Bridgnorth	Bewdley	Worcester	Avon	Upton	Tewksbury	Gloucester	Estuary	Wye	Bristol	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others	TOTAL
1637	0	1	0	24	1	0	0	22	7	3	18	0	3	1	1	0	2	83
1647	5	1	0	24	11	0	3	15	5	0	0	0	0	1	0	0	1	66
1656	22	1	8	62	42	12	4	59	22	69	6	0	1	3	0	11	1	323
1666	7	3	1	51	21	0	20	58	4	6	1	1	0	3	0	9	1	186
1674	7	4	1	43	20	0	16	33	0	3	0	0	0	0	0	2	0	129
1684	8	6	8	91	53	13	16	45	12	6	5	0	0	0	0	0	0	263
1697	20	9	19	37	61	9	5	32	26	0	14	0	3	0	0	0	0	235
1699	31	9	19	59	71	12	8	33	29	0	19	1	2	0	0	0	1	294
1704	22	10	14	59	52	16	2	36	20	0	16	5	0	0	0	0	0	252
1705	21	6	10	58	52	11	1	52	20	0	28	3	1	0	0	1	1	265
1706	24	5	15	53	47	7	2	41	25	1	30	0	1	0	0	0	2	253
1707	22	12	10	55	65	8	0	16	33	0	21	1	0	0	0	0	2	245
1708	23	14	12	64	68	6	1	20	32	0	27	0	1	0	0	0	4	272
1715	9	3	6	55	69	3	7	16	22	3	26	0	1	1	0	0	4	225
1722	0	16	16	83	60	1	2	23	22	2	32	0	2	3	2	0	7	271
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	70	70
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	77	77
1752	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	67	71
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	86

Percentage of all voyages

1637	0	1	0	29	1	0	0	27	8	4	22	0	4	1	1	0	2	
1647	8	2	0	36	17	0	5	23	8	0	0	0	0	2	0	0	2	
1656	7	0	2	19	13	4	1	18	7	21	2	0	0	1	0	3	0	
1666	4	2	1	27	11	6	11	31	2	3	1	1	0	2	0	5	1	
1674	5	3	1	33	16	0	12	26	0	2	0	0	0	0	0	2	0	
1684	3	2	3	35	20	5	6	17	5	2	2	0	0	0	0	0	0	
1697	9	4	8	16	26	4	2	14	11	0	6	0	1	0	0	0	0	
1699	11	3	6	20	24	4	3	11	10	0	6	0	1	0	0	0	0	
1704	9	4	6	23	21	6	1	14	8	0	6	2	0	0	0	0	0	
1705	8	2	4	22	20	4	0	20	8	0	11	1	0	0	0	0	0	
1706	9	2	6	21	19	3	1	16	10	0	12	0	0	0	0	0	1	
1707	9	5	4	22	27	3	0	7	13	0	9	0	0	0	0	0	1	
1708	8	5	4	24	25	2	0	7	12	0	10	0	0	0	0	0	1	
1715	4	1	3	24	31	1	3	7	10	1	12	0	0	0	0	0	2	
1722	0	6	6	31	22	0	1	8	8	1	12	0	1	1	1	0	3	
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	
1752	0	0	0	0	0	0	0	0	1	1	0	0	1	1	0	0	94	
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	100	

Table 3.5

Recorded upstream voyages, by home port, for all sample years

Shrewsbury, treated in the tables with the usually insignificant ports of Montgomeryshire, was one of the more important ports on the Severn in the earlier part of the period studied, but waned in importance in the early eighteenth century, at least in terms of voyages through the Port of Gloucester. There were substantial fluctuations in the numbers of voyages from the port, but during most of the period up to 1708 it maintained just under a 10% share of both downstream and upstream traffic, usually having between 20 and 30 voyages per year in either direction. The decline of vessels from Shrewsbury itself set in between 1708 and 1715. By 1715 there were only 17 downstream and 9 upstream voyages by the ports of its geographical group, of which most were in fact by the *Duchess* of Montgomery which was flourishing at this date. Wanklyn has argued that the decline was caused by difficulties of navigating the upper parts of the river for larger vessels capable of sailing into the estuary, and there was an increase in the trade of transshipping ports such as Tewkesbury, Gloucester and Worcester to compensate for this[18]. This can be seen especially clearly in the tobacco trade of the port[19].

The ports of the Severn Gorge have conventionally been regarded as the most thriving on the river, especially in the light of Perry's much quoted account of 1758 which listed more vessels belonging to the Gorge parishes than the rest of the river put together[20]. This was clearly not the case as far as the long-distance trade beyond Gloucester was concerned. The numbers of voyages made varied considerably from year to year, but for most of the period studied there were fewer than ten down or upstream. The Gorge ports therefore usually contributed about 3% of downstream or upstream voyages. Unlike Shrewsbury, however, they did not decline in the period, having 16 voyages both downstream and upstream in 1722. There is evidence that many goods from the area were transshipped at ports such as Worcester and Gloucester, but a through-trade seems to have been maintained[21].

Bridgnorth experienced a decline as a port in the early eighteenth century very similar to that of Shrewsbury, and it is known that its principal trow-owning family, the Jacksons, did move their business downstream to Worcester[22]. Its busiest period was between about 1684 and 1706, when the Jacksons left the port, during which it contributed some 7% of downstream voyages through Gloucester and 5% of those upstream.

The leading port on the Severn for almost the whole of the period studied was Bewdley, the link to the Severn for the trade of the industrial areas of the Stour Valley and Birmingham as well as an inland port for a large hinterland. Its industrial base in the iron and glass trades in particular gave it a lead upon which a substantial domination of the river trade, at least in terms of volume, was built. Even in the early seventeenth

century, Bewdley boats were responsible for about one fifth of the voyages through Gloucester, and this had grown to over a quarter by the early eighteenth century with increasing industrial success for its hinterland. Bewdley's main rival was Worcester, which, although it was usually slightly inferior in terms of numbers of downstream voyages, was usually the busiest port on the Severn in terms of voyages upstream. This must reflect the wealth of the city and its purchasing power in terms of imported goods. In many years Worcester boats made up about a quarter of upstream voyages.

The vessels of the Avon valley were nearly all boats of Evesham. These operated on what was a new navigation in the 1630s, and it was not until 1656 that they appeared in the trade through Gloucester at all, making 12 voyages upstream. They did not appear in the recorded downstream trade until 1684. From that date until 1705 they seem to have been employed in between 10 and 16 voyages in either direction each year. This was a small share in downstream trade of only about 4%, but a larger share of that upstream. Evesham boats were unusual in making approximately the same number of upstream voyages as they did downstream, indicating that the region provided a market able to purchase imports from outside. Like Shrewsbury and Bridgnorth, there was an appreciable decline in the trade of the Avon ports in the early eighteenth century, and their numbers of voyages fell to almost nothing by 1722.

Upton was one of the ports of the Severn which changed its patterns of trade most during the period. Its boats barely appeared in the trade through Gloucester before 1666. Even in the exceptionally busy and well-recorded year of 1656, only 4 Upton boats were said to have come upstream. From 1666 to abut 1699 the port then became busy, considering that it was a small town situated between the two much more successful ports of Worcester and Tewkesbury. In 1674, for example, 16 voyages were made upstream and 13 down, representing respectively 12% and 6% of all voyages. After this burst of activity, trade to and from Upton declined and changed its character. In 1704 there were only 7 downstream voyages and 2 upstream by boats of the port. Those out of Gloucester on Upton boats stayed at between 5 and 10 a year and then rose to 16 in 1715, but the number of upstream voyages remained much smaller.

Tewkesbury was a much busier port than Upton and at some periods more of its boats were recorded than those of any other port. It had more recorded downstream voyages than any other in both 1637 and 1647, and only Bewdley had more voyages upstream. It continued as the second busiest port, after Bewdley, in 1656, 1666 and 1674, until it was eclipsed by Worcester from 1684 onwards. However it maintained a reasonably stable number of voyages in both directions, at about 45 down and 35 up per year, into the early eighteenth century. After this time Tewkesbury seems to have become more concerned with transshipment of downstream cargoes rather than a

substantial trade of its own. In 1715 and 1722 Tewkesbury's upstream trade had dwindled to only 16 and 23 voyages a year respectively, whilst its downstream trade had grown to around 60, or 15% of all recorded outward voyages.

Despite its importance as the Customs port, Gloucester suffered varying fortunes in the share its own vessels had of the river trade. It was never a leading port in the same class as Worcester or Bewdley, or even Tewkesbury, and in many years even Shrewsbury boats made more voyages. Gloucester boats made 20% of recorded downstream voyages in 1637 and 14% in 1647, but they were in upstream trade at this time, and seem to have failed almost completely in 1666 and 1674. A gradual recovery was in progress in 1684, and at the turn of the century, Gloucester boats made about 20-30 voyages a year in either direction. Like Tewkesbury, no expansion took place for Gloucester in the upstream trade conducted by its boats, but it gained a more important role in transshipment of goods from further upstream, so that by 1715 and 1722 its vessels made about 14% of all outward voyages.

The ports of the estuary below Gloucester appear to have had very variable importance, but this appearance may partly have been caused by the irregular recording of voyages from the creeks of Newnham and Berkeley, which were their ports of departure in most cases (see Chapter 1). The fact that let passes were issued at these creeks makes the likelihood of under-recording for such ports much greater. It is noticeable that in the more thoroughly recorded year of 1656, estuarine vessels appeared out of all proportion to their importance in other years. Apart from this year, when they provided 20% of upstream voyages, they barely registered in upstream trade. In downstream trade, their prevalence reflected the presence of a Customs officer at the creek of Newnham, and none were recorded in the years 1699, 1704 and 1705. In 1706, when an officer was stationed at Newnham, 34 downstream voyages a year were recorded. It seems that the issuing of let passes there may have increased over the next few years, as recorded voyages slipped to only ten per year in 1722.

The chief home ports within the Wye grouping were Chepstow, Redbrook and Brockweir, most voyages recorded to and from Gloucester being by Redbrook boats. Their role in downstream trade was unimportant before about 1706, after which they began to make between 14 and 20 voyages a year, mainly in connection with the iron and copper trades. Upstream trade had been strong earlier, and Wye valley boats made 18 upstream voyages (10% of those recorded) in 1637. They made much fewer such voyages for the rest of seventeenth century, but by its end the number had grown again to about the same as before. Upstream voyages reached a level of about 30 per year for the remainder of the period. This was over 10% of upstream voyages and shows the importance of the metals trades between the lower Wye and the midlands.

One of the most extraordinary elements in the pattern of home ports was that Bristol boats played no part in the Severn trade. In all the years studied, they appeared in only 11 upstream and 4 downstream voyages altogether. It can only be suggested that the breadth of trade and trading opportunities at Bristol made direct participation in river trade unattractive to the city's merchants. Whatever the reason, trade with Gloucester was left almost entirely to vessels of the river ports, and it seems that boats capable of navigating the upper river were not kept by merchants at Bristol at all. With a few exceptions, the same was true of vessels from the other ports of the Bristol Channel. Boats of southern Wales or the south west peninsula hardly ever appeared in upstream trade, though in 1656 and 1666 there were 11 and 9 voyages to Gloucester by boats of Devonshire or Cornish ports, suggesting that a direct involvement was possible, and actually existed in the mid seventeenth century though it never did again. Bristol Channel vessels had a slightly larger role in downstream trade, but this was not significant until the beginning of the eighteenth century. Even at this dates most ports had no vessels communicating with Gloucester, but two exceptions principally created a more positive picture. These were individual boats of Swansea and Coggan Pill near Cardiff which were making frequent journeys by 1707 and 1708 along the south Wales coast from Gloucester with salt and other products of the Severn valley. Even these became less important by 1715, however, leaving the trade through Gloucester almost completely to vessels of the Severn itself.

iv. Ports of origin and destinations

Just as the numbers of voyages from each home port passing through Gloucester can be analysed, so can the numbers of voyages to and from each of the coastal ports beyond. Table 3.6 shows the numbers of voyages downstream to each of the destination ports, with the same data expressed as percentages of all voyages to those destinations. Table 3.7 shows similar data showing upstream voyages from each port of origin. The geographical groupings for the ports are the same as in the preceding tables.

One theme dominates these tables: the extraordinary power over the river trade held by Bristol. In every year studied, more than 70% of all recorded outward voyages from Gloucester were destined for Bristol. In many years Bristol's share of downstream trade was over 80%. Clearly, in terms of trade if not geography, it was Bristol not Gloucester which was the principal port of the Severn. As the 'metropolis of the west' it seems to have had the character of a primate city to the region, having a share of trade many times the size of its nearest rivals. Other ports than Bristol increased their share of the recorded voyages only for a short time in the early

Table 3.6

Recorded downstream voyages, by destination for all sample years

Voyages to each destination

Year	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Cross-R	Other	TOTAL
1637	132	0	18	21	3	1	0	9	184
1647	95	4	21	2	2	4	0	4	132
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	211	1	24	5	15	0	1	2	259
1674	170	0	20	0	3	0	9	6	208
1684	206	5	24	1	4	0	9	3	252
1697	260	14	9	0	48	0	21	5	357
1699	280	10	5	2	27	5	0	3	332
1704	247	18	7	0	33	7	16	3	331
1705	241	18	17	8	31	5	12	11	343
1706	239	14	15	11	35	3	6	8	331
1707	288	16	25	6	29	4	5	13	386
1708	284	22	22	8	36	10	0	12	394
1715	298	34	6	5	45	1	0	1	390
1722	298	43	14	14	35	1	0	2	407
1733	183	40	12	8	37	3	0	1	284
1741	212	24	19	10	29	2	0	1	297
1752	175	26	15	10	27	0	0	2	255
1765	77	3	20	9	31	1	0	10	151

Percentge of all voyages

1637	72	0	10	11	2	1	0	0
1647	72	0	16	2	2	3	0	0
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	81	0	9	2	6	0	0	0
1674	82	0	10	0	1	0	4	0
1684	82	0	10	0	2	0	4	0
1697	73	0	3	0	13	0	6	0
1699	84	0	2	1	8	2	0	0
1704	75	1	2	0	10	2	5	0
1705	70	1	5	2	9	1	3	0
1706	72	0	5	3	11	1	2	0
1707	75	0	6	2	8	1	1	0
1708	72	1	6	2	9	3	0	0
1715	76	1	2	1	12	0	0	0
1722	73	1	3	3	9	0	0	0
1733	64	1	4	3	13	1	0	0
1741	71	1	6	3	10	1	0	0
1752	69	1	6	4	11	0	0	0
1765	51	0	13	6	21	1	0	1

Table 3.7

Recorded upstream voyages, by port of departure, all sample years

All voyages into Gloucester
by port of departure

Year	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Other	Total
1637	34	21	13	11	0	1	3	83
1647	64	0	0	1	0	0	0	65
1656	242	16	31	16	4	11	3	323
1666	141	6	13	12	6	7	1	186
1674	109	2	10	4	4	0	0	129
1684	225	17	7	6	6	0	2	263
1697	204	21	7	3	0	0	0	235
1699	223	31	15	5	17	0	3	294
1704	199	24	14	5	8	1	1	252
1705	204	37	12	5	4	2	1	265
1706	198	36	8	7	1	2	1	253
1707	202	28	6	6	1	0	2	245
1708	227	29	7	2	1	2	4	272
1715	162	42	11	7	1	0	2	225
1722	187	48	14	14	2	2	4	271
1733	44	2	9	10	2	3	1	71
1741	35	3	8	23	5	0	3	77
1752	37	4	9	14	1	2	0	67
1765	27	7	5	28	6	2	11	86

All voyages into Gloucester
by port of departure
as a percentage of all voyages upstream

Year	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Other
1637	41	25	16	13	0	0	4
1647	98	0	0	2	0	0	0
1656	75	5	10	5	1	0	1
1666	76	3	7	6	3	0	1
1674	84	2	8	3	3	0	0
1684	86	6	3	2	2	0	1
1697	87	9	3	1	0	0	0
1699	76	11	5	2	6	0	1
1704	79	10	6	2	3	0	0
1705	77	14	5	2	2	0	0
1706	78	14	3	3	0	0	0
1707	82	11	2	2	0	0	1
1708	83	11	3	1	0	0	1
1715	72	19	5	3	0	0	1
1722	69	18	5	5	1	0	1
1733	62	3	13	14	3	0	1
1741	45	4	10	30	6	0	4
1752	55	6	13	21	1	0	0
1765	31	8	6	33	7	0	13

eighteenth century, and after 1725 when more distant voyages appear to have been recorded more effectively while the general level of recording declined.

The same dominance of Bristol was true of inward traffic to Gloucester. Throughout the sample years from 1666 to 1722, Bristol was recorded as the port of departure for consistently between 69% and 87% of voyages into Gloucester. Bristol's mean share of upstream voyages in these 12 sample years was 79%. A peak seems to have been reached in the first decade of the eighteenth century at 83% recorded in 1708, after which a slight fall seems to have set in with Chepstow increasing its own share of upstream traffic to around 18% in both 1715 and 1722. In the latter year Bristol's share had fallen to 69%. After this, the quality of recording for voyages from Bristol declined. Voyages in the sample years 1733 to 1765 were regularly only about one sixth of the numbers recorded in 1704-8. As might be expected from its predominance in the trade, Bristol's proportion of outward shipments compared with the total recorded at Gloucester was the same as the mean for all traffic of 59% between 1637 and 1722. This may indicate that it was slightly easier, on average, to find a back cargo in Bristol than in the other ports with which Gloucester communicated, or that fewer return cargoes went by let pass from Bristol than from other ports.

The port that was the next busiest to Bristol in terms of trade from Gloucester was Chepstow, the Customs port at the mouth of the Wye Valley region. It was the only region which consistently sent more inward voyages to Gloucester than it received in return. This was probably due to the fact that it was a port for the shipment of Forest of Dean iron, iron wire and copper, which were important raw materials for the midlands metallurgical industries, but that on the other hand it was a relatively small market for the products of the Severn Valley and already had the Wye Valley in its hinterland to supply many goods. Between 1666 and 1722 Chepstow received an average of 16 voyages a year from Gloucester. This figure was growing rapidly from only 1 in 1666 to 43 in 1722 as its metallurgical industries increased their emphasis on manufacturing rather than basic extraction, therefore requiring more materials such as bar iron from the midlands. It sent upstream to Gloucester an average of 25 voyages a year. This upstream total was growing more slowly, from 6 in 1666 to 48 in 1722, still much faster than the overall growth in trade in the period. As a result the imbalance of trade with Gloucester lessened. Over the period as a whole downstream shipments were only 39% of Chepstow's communications with Gloucester[23], representing a surplus in the favour of the Wye Valley in terms of voyage numbers. This compared with a deficit for ports below Gloucester as a whole, as discussed in section ii, of about 60%. By 1722, however, there was a more even balance.

The south Wales region as defined here, encompassing the coast from Newport

to Llanelli, received a regular traffic from Gloucester, and returned a smaller one. The number of voyages downstream never fell below five, and rose as high as 25. Upstream voyages ranged between 6 and 14 from 1666 onwards. There was therefore a substantial trade deficit for the region in terms of its voyages to and from Gloucester. Whilst it absorbed a range of craft goods, agricultural produce, metals and, after the 1690s also salt, south Wales sent back little more than limited amounts of coal and iron. The trade deficit of the region in numbers of voyages is surprising given the bulkiness of its own commodities, which might have been expected to produce a surplus. Some 65% of all its recorded voyages to or from Gloucester were outward ones.[24] The south Wales economy at this time was poor. The region was, however, close enough to Gloucester to have a reasonably substantial share of what direct trade from the Severn Valley remained after Bristol had absorbed the great majority. Its share of all downstream voyages comprised about 5% of the total in many years.

Unlike south Wales, over the period from 1666 to 1765 south-west Wales was almost always significantly in surplus in its trade with Gloucester. On average over this period there were 7 shipments a year to south-west Wales and 12 from it, although the latter figure was growing fairly markedly throughout the eighteenth century and reached 28 recorded voyages in 1765. This probably reflects accurately the level of absolute growth in voyages from south west Wales even in the mid eighteenth century, when the number of entries at Gloucester overall was declining. It was presumably largely the result of increased demand for Pembrokeshire anthracite, particularly for malting. Over the whole period only 36% of all south-west Wales' recorded communications with Gloucester was in return journeys downstream[25].

The remarkable expansion in the traffic going to Somerset, and especially to Bridgwater, around the 1690s was not matched by similar growth in trade to any other region, although traffic as a whole from Gloucester grew at this time. This seems, in fact, to have been a time when a new trading connection of lasting importance was established. Whereas trade to Somerset from Gloucester had been slight before this, it leapt up by 1697. The mean number of voyages to Somerset was 7 in the three sample years 1666, 1674 and 1684. From 1697 to 1765 trade remained reasonably stable around the new level of 34 voyages out of Gloucester a year. The staples of this trade were wool and salt, and it might be guessed that problems of obtaining these commodities from Spain and western France respectively had become prohibitive as a result of war and made it possible for the Severn valley producers to gain a foothold. However the most pressing reason for the sudden expansion was undoubtedly the breaking of the Droitwich salt monopoly in the early 1690s, which resulted in white salt shipped down the valley falling dramatically in price (see Chapter 5). Bridgwater had a

large demand for salt for fish curing, and must also have been a satisfactory entrepot for trade from the Severn valley, since it had a populous hinterland and was much more accessible for the Severn's river craft than were the more distant and exposed ports of Barnstaple and Bideford.

Somerset had an extraordinarily large trade deficit with the Severn Valley in terms of voyage numbers after around 1697, though this needs to be regarded with care given that let passes seem not to have been issued at Gloucester but were for a proportion of traffic from Bridgwater, as discussed in Chapter 1. From 1697 onwards it was regularly the destination for far more recorded voyages than departed from it. On average in the period after 1697 the Gloucester Port Books recorded 36 voyages a year to the Somerset ports of Bridgwater, Minehead and Watchet, compared with just over two returning, though the actual number of voyages returning was probably at least twice this[26]. Outward voyages to Somerset therefore represented 94% of all voyages recorded communicating between that region and Gloucester; significantly different from the percentage for Gloucester's traffic as a whole of 60%. This can probably be accounted for by the large market in the south west for goods from the Severn Valley, especially salt and wool, and the lack of cargoes to be carried back. Some of the vessels plying to Somerset may have returned via south-west Wales.

Direct trade to or from Devon and Cornwall from Gloucester was slight, never comprising more than a handful of recorded voyages a year. As with Somerset, more voyages were recorded going to the region than came back to Gloucester, the average being about four out and only two in. This may well have been under-recorded, however, if a large number of let-passes were issued at south-western ports, which is indicated by the much larger number of inward voyages from the region recorded in 1656. Like the voyages to Somerset, the number to Devon and Cornwall grew markedly in the 1690s, responding to the potential for new supplies of white salt from Droitwich for its fishing ports. This reached a peak in 1708 with ten outward voyages.

Some additional vessels went to Devon and Cornwall, Somerset and Wales which have not been included in the above figures because they went on round voyages to more than one region. These are indicated in the tables has having 'Cross-regional' destinations. There were bursts of recorded outward voyages of this sort at certain times, partly, no doubt, created by changes in the way in which destinations were normally recorded in the Port Books. Such cross-regional voyages may have been made in all periods. However it seems that a few vessels such as those of Upton and Coggan Pill contributed most journeys of this type, so the variation may reflect simply variations in individual fortunes. Whatever the variations over time, in their peak of recording in 1697, such voyages were 21 in number, representing nearly 6% of outward

voyages from Gloucester. Their normal routes were round trips to one or more Somerset and one or more south Wales ports, for example Bridgwater, then Newport and Cardiff, though they might also go to Chepstow, Bristol, or to the far ends of the Bristol Channel in some cases. No similar style of journey was recorded returning upstream, suggesting that the purpose of the voyages was to distribute rather than to collect goods.

Finally, there was trade to and from Gloucester involving ports outside the Bristol Channel, though it was very limited. Much of this trade was carried on from the deeper water quay at Newnham, and consisted of voyages to Liverpool and London, or on rare occasions ports such as Aberdovey, Whitehaven or Plymouth. The fact that these normally represented only 1% if Gloucester outward voyages and never exceeded 3%, demonstrates clearly the almost total concentration of the Severn river trade within the Bristol Channel.

v. Destinations from the home ports

Having assessed the patterns of voyages by home port and by port of destination or lading, it is worth examining the integration of the two so that special trading relationships can be gauged between particular ports. Table 3.8 shows the numbers of voyages by boats of each home port to each destination for the period 1704-8. The use of this five year sample permits variations from year to year to be smoothed out and significant quantities of data to be used for even the least common combinations of home port and destination. The same data are expressed in the form of percentages of all voyages from each home port, and all voyages to each destination. Figures 3.2 and 3.3 show this in the form of statistical maps.

The domination of downriver voyages by Bristol as a destination is clear in this data, but it is equally clear that it varied from one home port to another. As figure 3.3 shows, many home ports sent boats to Bristol but to virtually nowhere else. This is true of Shrewsbury, Worcester, the Avon ports and Gloucester. These were mainly places with little heavy industrial trade and which were supplying agricultural produce and other necessities to the Bristol market. The focus on Bristol of Shrewsbury and Evesham is understandable given their positions high up their respective navigations and the consequent use of dedicated river boats with less ability to sail in open water. However the role of both Worcester and Gloucester in transshipment of cargoes from further upstream[27] makes it surprising that they did not participate in voyages to ports further around the estuary. This is particularly surprising in the case of Worcester boats, nearly all of which were carrying salt which could find a ready market in the

Table 3.8

Recorded downstream voyages from each home port to each destination

Destinations of outward voyages
by home port
Five year sample 1704 8

From Home / To region	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Cor	Cross-R	Other	Total
Shrewsbury	142	3						2	147
Gorge	31	4	1				1		37
Bridgnorth	37	23	1	6	1	4	1		73
Bewdley	302	19	9	1	125		4	3	463
Worcester	407	6	1		5		1	5	425
Avon	37								37
Upton		3	16		5		11		35
Tewkesbury	158	1		1	27	14	21		222
Gloucester	127							2	129
Estuary	41		11	17		4		28	101
Wye	5	27	13						45
Bristol	1								1
S Wales			34	7	1	1	1	1	45
SW Wales			1	1					2
Somerset						3			3
Dev&Cor	1					6			7
Other	11	2						1	14
TOTAL	1300	88	87	33	164	32	40	42	1786

Voyages out of Gloucester to each destination
expressed as a percentage of all voyages from each home port
Five year sample 1704 8

From Home / To region	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Cor	Cross-R	Other	Total
Shrewsbury	97	2	0	0	0	0	0	1	100
Gorge	84	11	3	0	0	0	3	0	100
Bridgnorth	51	32	1	8	1	5	1	0	100
Bewdley	65	4	2	0	27	0	1	1	100
Worcester	96	1	0	0	1	0	0	1	100
Avon	100	0	0	0	0	0	0	0	100
Upton	0	9	46	0	14	0	31	0	100
Tewkesbury	71	0	0	0	12	6	9	0	100
Gloucester	98	0	0	0	0	0	0	2	100
Estuary	41	0	11	17	0	4	0	28	100
Wye	11	60	29	0	0	0	0	0	100
Bristol	100	0	0	0	0	0	0	0	100
S Wales	0	0	76	16	2	2	2	2	100
SW Wales	0	0	50	50	0	0	0	0	100
Somerset	0	0	0	0	0	100	0	0	100
Dev&Cor	14	0	0	0	0	86	0	0	100
Other	79	14	0	0	0	0	0	7	100

Voyages out of Gloucester from each home port
expressed as a percentage of all voyages to each destination
Five year sample 1704 8

From Home / To region	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Cor	Cross-R	Other
Shrewsbury	11	3	0	0	0	0	0	5
Gorge	2	5	1	0	0	0	3	0
Bridgnorth	3	26	1	18	1	13	3	0
Bewdley	23	22	10	3	76	0	10	7
Worcester	31	7	1	0	3	0	3	12
Avon	3	0	0	0	0	0	0	0
Upton	0	3	18	0	3	0	28	0
Tewkesbury	12	1	0	3	16	44	53	0
Gloucester	10	0	0	0	0	0	0	5
Estuary	3	0	13	52	0	13	0	67
Wye	0	31	15	0	0	0	0	0
Bristol	0	0	0	0	0	0	0	0
S.Wales	0	0	39	21	1	3	3	2
SW.Wales	0	0	1	3	0	0	0	0
Somerset	0	0	0	0	0	9	0	0
Dev&Cor	0	0	0	0	0	19	0	0
Other	1	2	0	0	0	0	0	2
Total	100	100	100	100	100	100	100	100

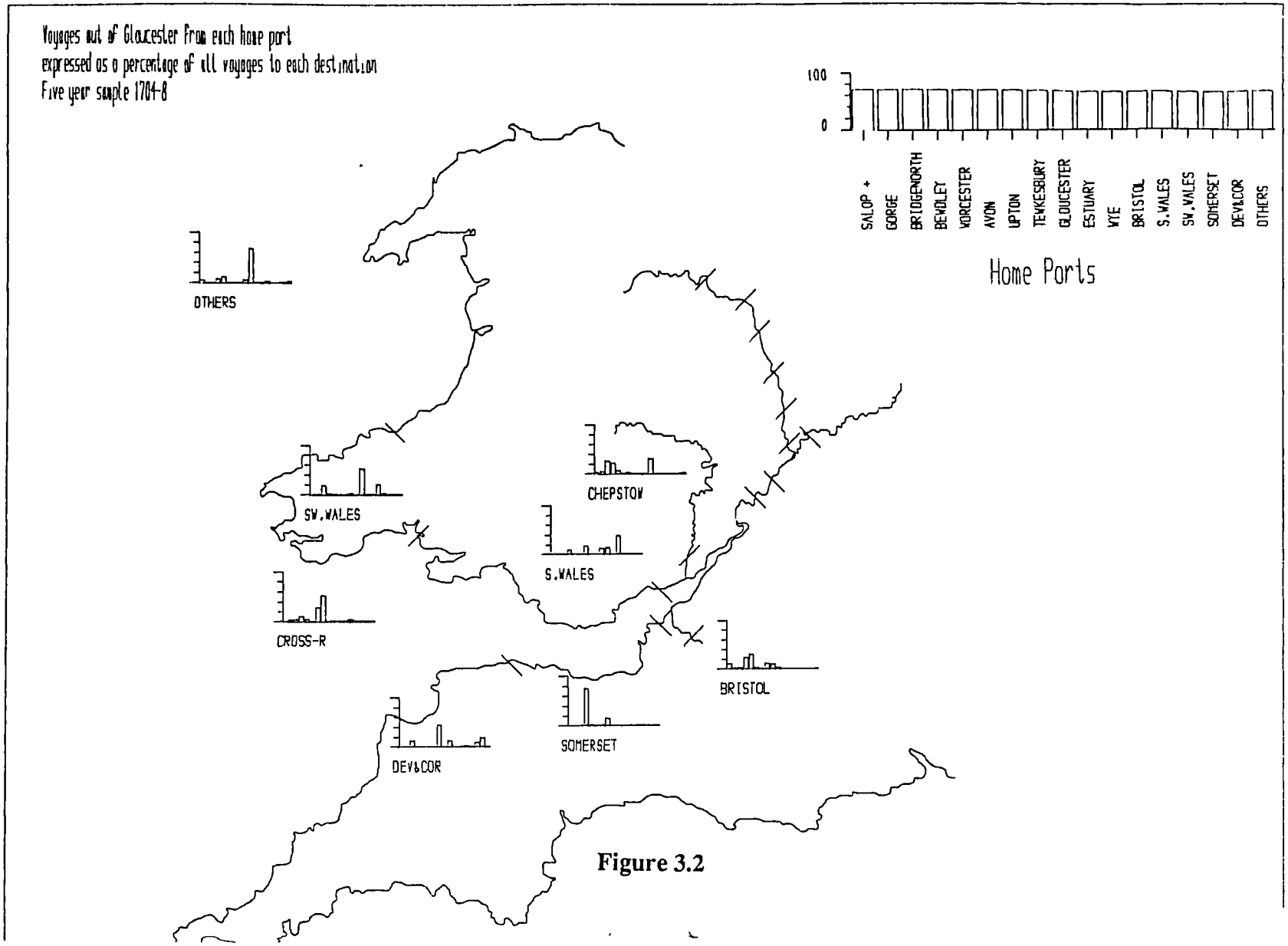

Voyages out of Gloucester from each home port
expressed as a percentage of all voyages to each destination
Five year sample 1704-8
100
0
SALOP +
GORGE
BRIDGENORTH
BEWDLEY
WORCESTER
AVON
UPTON
TEWKESBURY
GLOUCESTER
ESTUARY
WYE
BRISTOL
S.WALES
SW.WALES
SOMERSET
DEV&COR
OTHERS
Home Ports
OTHERS
SW.WALES
CHEPSTOW
S.WALES
CROSS-R
BRISTOL
SOMERSET
DEV&COR

Figure 3.2

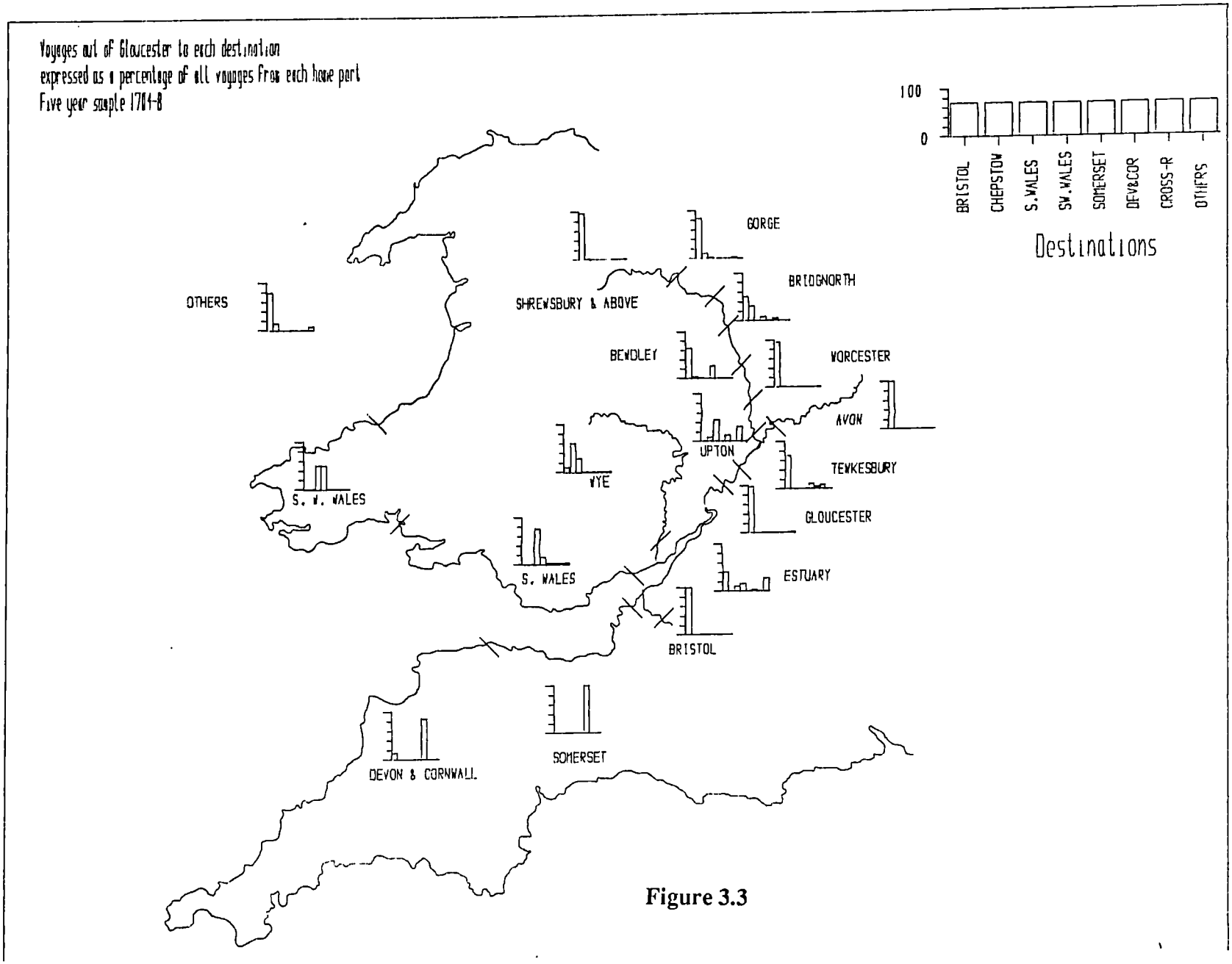

Voyages out of Gloucester to each destination
expressed as a percentage of all voyages from each home port
Five year sample 1704-8
100
0
BRISTOL
CHEPSTOW
S.WALES
SW.WALES
SOMERSET
DEV&COR
CROSS-R
OTHERS
Destinations
GORGE
BRIDGNORTH
OTHERS
SHREWSBURY & ABOVE
BEWDLEY
WORCESTER
AVON
UPTON
TEWKESBURY
WYE
S. W. WALES
GLOUCESTER
S. WALES
ESTUARY
BRISTOL
SOMERSET
DEVON & CORNWALL

Figure 3.3

fishing ports of the Channel. It may be that the strength of the trading relationship between Worcester and Bristol was such that plentiful lucrative opportunities existed in this regular traffic without venturing on occasional voyages elsewhere. This is not a satisfactory explanation on its own, but no other suggests itself from the evidence currently available. Gloucester's narrow traffic is similarly puzzling, although the essentially agricultural nature of its trade might have made it more suited to supplying the Bristol market than any other.

The ports which traded beyond Bristol on an appreciable scale were Bridgnorth, Bewdley, Upton, Tewkesbury and the estuarine ports. Bridgnorth had a strong trading relationship with the Wye Valley through Chepstow, principally dealt with by the Jacksons[28] and concerned with the iron and non-ferrous metal trades to and from the Shropshire coalfield. Its vessels seem to have had an advantage in this trade over even those from slightly further upstream at the Gorge, which hardly ever ventured beyond Bristol. Bridgnorth boats also had occasional connections in the period with south west Wales and with Devon. Bewdley's traffic was dominated by Bristol, but it also participated in regular voyages to Bridgwater. One of the Beale family was established later at Bridgwater to coordinate a regular service between it and Bewdley, and it seems this arrangement may already have been in place by the beginning of the century[29]. Tewkesbury boats followed a similar pattern of trade, making a few voyages to Somerset and Devon as well as the majority to Bristol, but they also took part in some cross-regional voyages.

The two groups of river ports which were not dominated by the Bristol trade were Upton and the estuarine ports. The Upton boats did not enter Bristol, but were occupied in voyages to most other parts of the Bristol Channel, going to south Wales especially, to Chepstow and to Somerset, and having a leading role in cross-regional voyages which tramped from one Channel port to another. The estuarine ports, principally Newnham, also had trade with most parts, but most commonly with Bristol and Wales. As let passes were probably issued at Newnham at this time, there may have been other voyages, especially over the short distance to Chepstow. Newnham was almost unique in having connections with places outside the Bristol Channel, and about a quarter of its outward voyages were to London or Liverpool.

The rare boats from the wider Bristol Channel ports mainly plied trade simply between their own region and Gloucester, though some seem to have gone to other nearby ports, such as the Welsh boats which went to both south and south west Wales, and the Barnstaple boats that took some cargo from Gloucester to Bristol.

Figure 3.2 summarises these patterns from the point of view of the destination ports in the Bristol Channel. It shows, for example, the special relationship between

Chepstow and the upper river ports. Nearly all of the recorded voyages from Gloucester to Chepstow were by boats either of the Wye ports or of Bridgnorth or Bewdley. This underlines the intimate relationship between the metals industries of the Wye valley, the Stour valley and Shropshire. The Welsh trade was made up principally of boats from the Welsh ports themselves and the boats of the lower river, notably Upton and Tewkesbury. Somerset was principally provided with traffic by boats of Bewdley and Tewkesbury, and Devon and Cornwall by boats of Tewkesbury, the estuary, and its own ports. Finally, the predominant roles can be seen of Upton and Tewkesbury in the cross-regional trades, showing the operational flexibility of their lower-river boats; and, also for reasons of accessibility, of Newnham in the trade with ports outside the region.

vi. Fluctuations and seasonality

One theme of importance concerning trade patterns and concerning trade by river navigation in particular is that of irregularity and disturbance. Historians of river navigation in the pre-industrial period have been inclined to emphasise its difficulty, suggesting that it was of limited benefit before the river improvements which began on a large scale in the 1660s[30]. A connected theme has been the idea that trade patterns as a whole in this period have been considered liable to extreme fluctuation and great influence from government influence, the seasons and the state of the harvest[31].

The decadal sample years which have been discussed already show considerable variations in numbers of voyages from one year to another. There are dangers in attempting to interpret patterns of causation from these, without a context of adjacent years. Nevertheless, some of the more powerful influence can be picked out. These are explored in more detail with respect to particular commodity trades in Chapter 5 and Chapter 6. From the figures presented already in this chapter, the decay of trade in certain years can be postulated briefly. Traffic on the river in 1647 appears to have been quiet compared with the sample years before and after it, suggesting that the recent and severe disturbances of the Civil War had had a damaging impact on trade in the Severn Valley. It is clear that 1674, too, was a very poor year for trade, and this is consonant with the depression in trade reported at that time, caused partly by the recent Anglo-Dutch War[32]. There is also some evidence that trade in the year 1715 was badly damaged by high harvest prices and uncertainties created by the Jacobite rebellion. Many more cycles and disturbances affected particular trades rather than traffic as a whole, and are discussed more fully in subsequent chapters[33].

The kinds of fluctuations which were 'normal' in the economy, and could be

expected in any year compared with those adjacent to it, can be viewed more effectively from the data for the continuous five year sample 1704-8. These show that considerable variations could also occur even in the short term. In the five years the numbers of voyages fluctuated between 583 and 666 around a mean of 614, or by 14% expressed as variation from the lower figure. Clearly, the level of internal trade might be expected to fluctuate appreciably from year to year in the pre-industrial period. However it would be wrong to suggest that such fluctuations were of a magnitude that suggested a chaotic or unstable economy. Modern economies fluctuate annually in similar proportions, as regularly reported changes in interest rates, inflation, and retail sales constantly testify. Such variations also show that individual sample years can be interpreted as indicative of their period only within certain limits of confidence. These limits must be expanded considerably when examining years of important disturbance to trade, such as the those of the 1640s.

The seasonal regularity of trade on the Severn can also be shown to have been high, conflicting with the accepted view that river trade was forever delayed and disturbed. It is certain that there were delays, particularly on the uppermost reaches of the river, and these seem to have become more serious during the eighteenth century, as the decline of voyages from Shrewsbury and Evesham indicates, together with the increase in transshipment activities at ports further downstream. In spite of this, vessels sailed regularly on many voyages. Those from Bewdley to Bristol went four or more times per month and failed to do so on only one occasion in the 60 months 1704-1708[34].

The seasonality of trade on the Severn would seem to be more demand led than supply enforced. Table 3.9 shows the share of shipments passing in each calendar month for all the sample years. The summer peak of shipments coincides with the period when water is most likely to be in short supply due to low rainfall and high evapotranspiration rates. The growth in traffic may perhaps be related to sale time in the coal industry, which was the custom of using miners to shift coal on the surface when road conditions were at their best. This may have been an important factor for many trades along the Severn, which was in large parts a clay vale of poorly draining soils or else was in relatively hilly and similarly impermeable territory like the Severn Gorge or the Forest of Dean. It is possible that though the river had its navigational problems in summer, these were slight compared with the difficulties of using the roads at other times of year. The fact that trade also continued on the river in winter, and even in the months of January and February which were most liable to frost, suggests that even this did not pose severe difficulties for river merchants and allowed them to continue to supply high winter demand for coal for domestic use, for iron for seasonally

Table 3.9

Percentage of recorded annual downstream voyages made in each month

Percentage of annual shipments per month for each sample year
Downstream only

	1637	1647	1666	1674	1684	1697	1705	1715	1722	1733	1741/2	1752	1765
Jan	17	12	11	10	0	9	11	8	9	8	5	6	7
Feb	8	8	7	7	9	9	6	7	8	6	4	6	9
Mar	8	10	7	7	10	9	8	8	8	12	5	7	10
Apr	10	10	5	8	11	7	10	10	6	9	6	7	5
May	5	13	9	9	9	6	8	7	7	6	7	9	11
Jun	8	8	5	7	8	6	8	7	11	10	7	10	6
Jul	11	16	8	12	12	11	8	11	10	10	7	11	9
Aug	5	6	8	6	6	7	8	8	8	9	9	11	8
Sep	7	2	8	5	9	8	6	8	9	8	13	4	8
Oct	8	5	14	8	12	8	8	10	8	8	12	9	11
Nov	4	6	11	9	10	8	11	11	10	9	14	9	9
Dec	7	4	6	11	4	12	7	7	6	6	10	9	7

Table 3.10

Percentage of recorded annual downstream voyages made in each month for boats of Shropshire home ports

Shropshire boats, downstream only

	1647	1674	1697	1706	1715
Jan	23	19	11	10	10
Feb	0	12	6	10	7
Mar	23	8	7	6	8
Apr	0	4	11	13	10
May	15	0	7	7	7
Jun	8	4	7	6	5
Jul	15	15	12	16	12
Aug	0	8	9	4	5
Sep	0	12	8	4	10
Oct	8	0	6	6	15
Nov	8	12	4	13	3
Dec	0	8	9	6	7

working forges, and for agricultural products which most needed to be transferred inter-regionally when local supplies from the harvest had been used up.

Although stoppages were frequently recorded on the Severn, these do not seem materially to have affected the potential for shipping items into or out of Gloucester over a long period. Telford recorded in the 1790s that barges in the Ironbridge Gorge were often stranded for several weeks. The complaints of John Kelsall, the manager of an iron forge in Montgomeryshire in the 1720s, were not unusual. He referred to having to load a barge at two in the morning in order to catch the river in spate, only to have it held up again before Shrewsbury[35]. Severe drought or frost may have closed the river to the larger vessels for days or weeks, but the trade was able to get through after a wait, so that monthly shares of trade were hardly ever seriously distorted. This seems even to have been the case for boats from higher up the river, which would be expected to have been more affected by both drought and frost, since the river was shallower and more liable to freeze for several reasons.[36] However the figure for monthly shipments in a selection of years for boats travelling down from Shrewsbury, the port of the Severn Gorge, and Bridgnorth in Table 3.10 show little more variation than for the river trade as a whole. For example in 1706 no individual month had less than 4% of the year's downstream voyages of Shropshire boats. Again, the variation that occurs fits better with an interpretation of demand focussing the patterns rather than physical barriers to navigations impeding them.

This chapter has attempted to break down the trade of the River Severn according to a series of analytical principles. There is some danger in this, of gaining an understanding of the river's trade which is entirely logically based and explodes any vision of the river as a whole. Mark Twain found that in mastering the analytical knowledge of the Mississippi which enabled him to become a steam boat pilot, he lost his vision of the river's grandeur and beauty[37]. Having exploded the trade of the River Severn into small pieces, it is therefore important to attempt to see it as a whole again by discussing the commodities that were the lifeblood of trade.

CHAPTER 4.

THE GOODS OF TRADE

Less is known about the range of types and the relative quantities of goods carried on English river navigations in the pre-industrial period than almost any other major aspect of their history. Many assumptions have been made about the nature of trade by river, but these have not been supported by detailed quantitative evidence, and they can be shown to define trade carried incorrectly. Willan, Hadfield and others have made vital contributions to knowledge of the development of waterways networks, and others have studied individual river improvement projects[1], but there has been a paucity of detailed investigations of the patterns of river trade, the goods carried, the mechanisms of carriage, or changes in these characteristics over time[2]. The computerisation of the Gloucester coastal Port Books permits detailed analysis for the first time of the unique evidence they contain to address these issues. The purposes of this chapter are to enumerate the range of goods carried, and to define, with the aid of a classification, some of the principal characteristics and patterns of cargoes on the Severn.

i. The range and types of goods

It is an accepted view that river navigations, and indeed later canals, were principally of importance as conveyors of bulky and low-value goods. For example Dyos and Aldcroft identified only coal and bulky industrial goods with river carriage, Duckham's arguments for the importance of water transport ignore goods other than coal and agricultural produce, and Willan's account of cargoes carried on English rivers, in the most extensive study of the subject carried out, is almost exclusively concerned with coal, corn and other bulky goods[3]. Other scholars have been keen to find differences between road transport for higher value goods, and water carriage for bulky, low-value ones. For example, Chartres asserts, 'While there was some overlap between land and water carriage... it is important not to assume that the demand for transport services was homogeneous' and speaks of low value to volume goods only on river navigations[4]. Freeman's analysis of the industrial revolution period, too, focuses on the suitability of water carriage mainly to bulky, low-value goods which were not needed urgently[5]. Most sources encourage such interpretations, as they are toll records of tonnage rather

than value, and the vast majority date from the end of the eighteenth century, by which time trade in coal had grown enormously. Interpretations of this sort have tended to be imposed on the pre-industrial period albeit that systematic studies have not been made of the goods carried on river navigations of the time. The goods carried on the Severn were much more diverse than views of river navigation in the period normally allow.

A wide range of goods are recorded in Gloucester Port Books. An alphabetical list of commodity terms that appear begins with 'actors' goods' and ends with 'young fustic', and contains over 3,000 terms. Casual reading of the documents reveals entry after entry containing numerous and diverse goods which are far from the traditionally perceived staples of waterway transport like coal, clay, grain and iron. For example a typical entry from 1697, describing a Bewdley boat sailing upstream from Bristol, contains not only the staple bar iron but also oil, herrings, fish, grocery, saltery, dyestuffs, corks, pitch and rosin, whisks, soap, old wool cards, tobacco, tobacco dust and stems, and lampblack[6]. Naturally, there are less diverse cargoes, including a few which include only iron or coal, but many are more wide-ranging still.

The fact that many different words appear in the documents is unimportant if it represents nothing more than that the Customs officers had a large vocabulary; but it is of great importance if it demonstrates that the utilisation of water transport was more complex than has been thought. The problem of assessing this diversity of cargoes more critically must be solved if the nature of river carriage is to be understood.

The simplest means of quantifying the diversity of items is to count the terms used to describe the cargoes. This does not provide an accurate appreciation of the diversity of trade, but it does give a rule of thumb to the range of goods and enables broad comparisons over time. However, to count terms even in so simple a form is a major task which students of Port Books, or other records of trade, have not attempted before. Willan commented, 'It is impossible to enumerate all the articles of manufacture which were carried by the coasting vessels'[7] and examined categories of goods rather than attempting to define the range or number carried. The forms of words which appear in the Port Books are represented by a multiplicity of phrases which can put terms in different orders, such as 'six packs and trusses of woollen cloth, rugs and girthwebb'. As has been discussed in Chapter 2, such phrases can not be broken down into their component parts for the purposes of counting *volumes* of goods carried, because the relative quantities of each good is unknown. However if the aim is to count the *number* of different kinds of goods carried, breaking the strings of words up is essential. Some 12,000 different commodity strings appear in the Gloucester Portbooks Database, but many of these differ from one another only in that they represent unusual combinations

or varying orders of goods. It is therefore more fruitful to count not the number of different strings but the number of different components. This has been done over the whole database by taking the list of all 12,000 strings that exist and removing from it all which contain a plus sign, which links different terms in a phrase like 'linen + woollen + mercery', and then splitting those phrases up into their component parts. An automated cross-referencing of the two lists created has been carried out to add to the main list all those terms which had previously *only* appeared in longer strings. This was then edited manually to ensure that phrases were not unreasonably broken up, such as 'ox and cow hides in the hair', and words that did not make sense on their own (such as 'ox' in this context) were excluded[8]. The final list of just over 3,000 terms is therefore a reasonable count of the vocabulary used by the Customs officers. It does not necessarily represent the number of different items carried. Some goods are almost certain to have been counted twice. For example, 'Irish hides in the hair' and 'Irish raw hides' are probably, but not definitely, the same commodity. Nevertheless, this list includes at least 2,500 genuinely different commodities carried on the Severn.

Similar procedures can be followed more accurately to count the numbers of goods carried in particular sample years. This is a more valuable, as the smaller number of cases means that manual exclusion of obvious synonyms is feasible. It also gives an impression of the number of commodities carried at any one time without giving undue prominence to numerous items that appeared only once or twice in a long period. Finally, it permits comparisons between one year and another. This exercise has been carried out for a selection of sample years, as shown in Table 4.1.

The first column shows the number of different strings of words describing commodities that appear. This is, in itself, some index of the diversity of cargoes. However, two steps have been taken to rationalise these figures. The second column shows the number of different terms for goods that appear in the strings and is calculated by subtracting from the total all strings that contain more than one term, and then adding to the total all those terms that do not appear separately. Thus, for example, the multiple term string 'beef + pork + cheese' is subtracted from the total number of the strings from 1666, but the term 'pork' is replaced as, unlike 'beef' and 'cheese', it does not appear separately as a term in that year. This second column is therefore an accurate count of the number of terms which appear in each year, directly comparable with the number of 3,079 terms appearing in the database as a whole. The figures show that although many terms were used over the period studied, a small proportion appeared in any one year. The majority of the terms that appear therefore do not represent regular trade. The number appearing per year represented perhaps only one tenth of those recorded overall.

Table 4.1

Number of commodities carried in selected sample years

	Strings	Terms	Commodities	Commodities >1 occurrence
1637	71	72	60	39
1666	347	302	262	174
1706	509	408	329	215
1722	574	484	400	270
1752	228	222	187	107

Another problem needs to be addressed in interpreting these figures, namely assessing how often synonyms were used, or, on the other hand, how often the use of generic terms concealed diversity: for example do 'red Port wine' and 'Portuguese wine' mean the same thing in some instances, and should the word 'wine' on its own be treated as a separate commodity or as the generic commodity which should be counted? Underlying this is the problem of finding a logic with which commodities can be classified for enumeration. Should one regard different products of the brass industries, for instance - brass pots, brass ingots, brass wire - as different commodities because they had different uses and were produced by different sections of the industry? If so, should one also count separately various kinds of pots, such as kettles, furnaces, cauldrons and pans? These are almost unresolvable taxonomical and ontological problems, but some definition and reduction of the distortion is helpful. To this end, a further set of figures has been included in the third column of the table, representing the adjustment made when obvious synonyms are excluded. As has been explained in Chapter 2, the Portbooks Database preserves the original forms, though not usually spellings, of commodity descriptions. These include phrases such as 'haberdashery', 'haberdashery ware' and 'haberdashery wares', all of which appear in 1666 and almost certainly refer to the same goods. Wherever there is a strong likelihood that words are exactly synonymous, the figures have been reduced in accordance. This is a hazardous task, so no attempt has been made to do more than extract synonyms, for example by developing a classification which would count only 'iron', rather than 'iron hammers', 'iron pots', 'pig iron', and 'wrought iron'. This would be inappropriate in examining the full diversity of goods carried on the river, and an examination of the patterns of carriage of goods in the next section utilises a broad classification. The extraction of

synonyms in this way markedly reduces the figures to represent in a more real sense the goods carried during any given year. However it still shows a very large number: ranging from 60 to 400. This shows that by the early eighteenth century at least, a wide range of commodities was carried by river; much wider than the staple goods generally considered to have been important.

One further refinement of the figures is helpful. This tackles the question of how meaningful it is to count the number of different goods that appeared given that some were commonplace and some rare. Many goods only appeared once in any given year, perhaps because they were rare commodities at the time; perhaps because they were only carried because one person on one occasion found it convenient. The final column in Table 4.1 therefore shows the results of subtracting all commodities that appeared less than twice. In 1666, for example, this results in the reduction of the figure from 262 to 174 by extraction of commodities such as 'black cloth', 'books', 'camels hair', 'iron grates', 'lard', or 'tin plates'. Though these may have been important articles of trade at other times, they were not regularly traded in 1666. This refinement helps to separate the significant from the insignificant.[9]

Several points can be made from the completed table, although it can only be regarded as an impressionistic indicator of the numbers of commodities carried. Without a linguistic philosophy that allows agreement on a taxonomy of commodities and the abolition of all synonyms, an accurate index of goods carried is impossible. The first point is that a surprisingly large number of goods were traded through the Port of Gloucester, much larger than the conventional view of river transport would suggest. The second point is that although many goods seem to have been carried casually, an appeared only once or twice, the majority were carried more frequently, and this group, too, represented a wide diversity. Even in 1637, for example, articles of trade as diverse as apples, barley, coals, cottons, bar iron, herrings, grocery, leather and hides, malt, ropes, tin, train oil, wine, wool and yellow wax all appeared several times each. Not all of these, by any means, were the traditional bulky staples associated with river trade. Finally, and perhaps most importantly, the number of goods appears to have grown significantly during the period studied, though the decline in quality of the books from the later 1720s is reflected in the smaller number recorded in 1752. More than half as many goods again were regularly carried in 1722 than had been in 1666. Among those which appeared on the river between these dates were Bath water, bell metal, copper and callamy, bendware, clover seed, deal boards, ivory, lampblack, and rum. It seems that an increasing diversity of goods was traded during the seventeenth and early eighteenth centuries, and that the Severn was an appropriate means of carriage for them. The range of crafts and manufactures carried, in particular, seems to have

grown markedly, although many of these were of low value in relation to their bulk[10]. The tabulated data represents the numbers of commodities being carried on the river, but it does not represent their diversity as such. Some further analysis is needed to establish the full range of goods traded. This can best be established by examining the actual trade of the river against a model of the diversity of traded goods. Table 4.2 indicates the types of goods that might exist according to several classifications following wholly different analytical approaches, and shows some of the goods recorded in one year of the Port Books, 1706. All the examples listed were commodities of frequent carriage: that is they were carried on at least ten voyages during the year, and in most cases much more frequently. This shows that if the diversity of goods is measured by any criterion, a wide range of goods were carried. Whether diversity is defined in terms of bulk to value ratios, of the stage of commodities in processing, of the types of organisation concerned with trade, of the trade sectors present in the economy, or of the varieties of staples of economic life, examples were present from each grouping within each classification.

Clearly, some categories are better represented than others. In some cases, such as the fishing sector, the small number of examples may simply represent the fact that there was a small range of goods available. However, goods associated with putting-out systems of production seem to have been much less well represented than those associated with highly capitalised and centralised production or urban crafts. For example, metalwares produced in the west Midlands do not feature in this list as separate items, though they were almost certainly concealed within the term 'ironware', as Rowlands makes it clear the Severn was being used by midlands metalware dealers at this time[11]. Woollen cloth, too, was quantitively under-represented. This may reflect the heavy commitment of putting-out industries to road transport to reach widespread points of production, causing the influence of road transport to spill over into longer-distance trade[12]. In contrast, the centralised production of commodities such as cast and bar iron focused trade on specific channels and encouraged the use of the cheapest routes, although overland transport was also necessary in some cases. Nevertheless, it is remarkable that the use of river transport seems to have permeated, to at least an appreciable extent, every branch of the trading economy. Professor Hoskins showed his characteristic percipience when he wrote twenty years ago that 'a large proportion of inland trade went by river, far more than has ever been generally realised'[13].

The complexity of cargoes carried, and the increase in their diversity over time, can also be illustrated by counting the numbers of 'consignments' carried per year. By this is meant the number of different groups of goods itemised in the

Table 4.2

Model of the diversity of goods by various classifications
Examples recorded more than ten times in 1706

Class	Examples
Staples	
Food	cheese, cider, grocery, herrings, hops, malt, Port wine, Spanish wine, wheat
Fuel	coal, timberstuff (may have been burned)
Textile	woollen cloth, haberdashery, Kidderminster stuff, linen, Manchester ware, serge
Mineral	callamy, lead ore, magnis, pot clay, white salt
Metal	tin, brass, copper, copper money, iron, iron guns, ironware, lead, shot
Trade sectors	
Agriculture	hemp, hemp seed, hops, barley, wheat, oats, teazles, wool
Forestry	deal boards, lath, rind hoops, timber, timberstuff
Fishing	herrings
Fuel supply	coal, timberstuff
Mineral extraction	callamy, lead ore, magnis, pot clay
Mineral products	glass, glass bottles, earthenware, bricks, pipes, white salt
Chemicals	glue, soap, white salt
Metal processing	bar iron, brass, copper, tin, lead, old brass, pig iron
Metal manufacture	copper money, ironwares, iron guns
Food and drink	bacon, bottled cider, butter, cheese, cider, grocery, saltery, oranges, Port wine
Textiles	apparel, woollen cloth, cotton wool, girthweb, haberdashery, Kidderminster stuff
Leather	calfskins, cow hides, tanned leather, shreds, white leather
Woodworking	chairs, lath, rind hoops, timberstuff
Construction	bricks, deal boards, laths, timber
Organisation of trade	
Urban guilds	mercery, woollen cloth, tanned leather, grocery
Putting out	wool, serge, linen, woollen cloth
Capitalised	bar iron, tin, brass, copper, glass bottles, ironwares, iron guns, paper, pig iron, soap
Market-oriented	barley, cheese, earthenware, hemp seed, hops, teazles, wheat, cider, perry
Ad hoc/local	apparel, bacon, bricks, butter, tobacco pipes, household goods
Process stage	
Raw materials	magnis, barley, callamy, hops, pot clay, wool, cotton wool, teazles
Processed materials	bar iron, pig iron, deal boards, malt, rind hoops, thread, wickyarn
Consumer goods	apparel, bacon, butter, chairs, earthenware, glasses, money, bottled cider, shot
Bulk/value	
High value	earthenware, oranges, mercery, money, paper, Port wine, tobacco
Medium value	calfskins, chairs, bottled cider, linen, shot, tar, thread
Low value	coal, timber, iron, pot clay, oats, bricks

cargo descriptions in the Port Books. It has an arbitrary element, reflecting as it does the manner in which the Customs Officer chose to write out the cargo, but it does provide some indication of the growing diversity[14]. The results of this analysis are shown in Table 4.3. The first column shows the number of consignments, and the second the total number of voyages made up and downstream in the year in question. The third column is the first divided by the third to indicate the mean number of consignments on each voyage.

Table 4.3

Number of 'consignments' per voyage in selected sample years

	'Consignments'	Voyages	Mean per voyage
1637	468	267	1.75
1666	2559	445	5.75
1706	3738	584	6.40
1722	5094	678	7.51
1752	1569	322	4.87

It is clear from this analysis that the river trade was not dominated by vessels carrying single commodities in bulk. Like the numbers of goods carried demonstrated above, it is clear that the numbers of consignments per voyage increased markedly during the late seventeenth and early eighteenth centuries.

ii. The changing outward and inward trades

In order to assess the broad characteristics of the commodity trades of the Severn, it is necessary to use an analytical framework which classifies the goods and commodities carried. The broken images in the kaleidoscope of 2,500 commodity trades is impossible to resolve in anything other than a numerical or static sense, unless a way of aggregating and simplifying the data is found.

In the tables below, a simple classification of all goods recorded in the Port Books has been used to analyse the contents, origins and destinations of all the voyages in the sample years studied. The technical methods have been discussed in chapter 2. The results of analysing portions of the database in this way are discussed here: examining the changing prominence of the different classes in inwards and outwards

trade over all the sample years, and analysing in more detail the classes according to destinations, home ports and ports of departure for the five-year sample 1704-8. It is necessary before examining this to explain briefly the nature of the classification.

No classifications are agreed for the commodities or economic sectors of pre-industrial England which could command a substantial consensus. The classification devised here may stimulate thought and provide a model suited to some purposes[15]. This is an eight-fold grouping of commodities based upon the broad economic sector of origin of each commodity. This is more appropriate than classification by sector in which a commodity was consumed, by the raw materials from which it was made, or by the stage of commodities in the productive chain. Classification by use is undermined by the fact that many important commodities had several uses, such as coal, which might be used domestically, by smiths, for smelting, for malting, for lime burning, or other purposes. Raw material type indicates little about economic structures and is confused by the almost infinite variety of unknown mixtures of material origins used in textiles and many other crafts, even though it might give an interesting picture of the changing pattern of resource exploitation. Although classifications by stage in the chain of production are commonly used by economists, separating raw materials, producer goods, finished goods, and foodstuffs, these are difficult to apply to many goods and do not give a clear view of regional specialisms.

Classification by sector of production, however, can provide the most valuable view of temporal and geographical variations in economic specialisms, indicating the kinds of productive activities that were using the river and how these varied from place to place and changed over the period. Most commodities fall naturally into a simple classification on this basis, although there are problematic commodities and some odd bedfellows given the aim to reduce to so small a number of groups. The classification encompasses all 3,079 terms for goods and commodities that have been transcribed from the Port Books, apart from 85 which present insuperable problems. None of the terms excluded make an appreciable difference to the results of the exercise. Some were excluded because their meaning was not identifiable, for example 'seabeds'[16]; some because they were ambiguous, such as 'whiting', which could refer to fish or to colouring; and a few because they were such general terms as to be unclassifiable, such as 'British wares' or 'necessaries'. None of these is a common item of trade.

The eight classes are as follows: Metals, Extractive minerals, Crafts and manufactures, Textiles, Wood, Agricultural produce, Food and drink, and finally Products of the sea and fisheries.

There are unavoidable areas of overlap between these categories, and it is necessary to identify some of the chief ones. The most difficult boundaries are those

between crafts and manufactures on the one hand and metals, wood and textiles on the other. For the purposes of this study, the metal trades have been taken to include all the goods concerned with the extraction and production of metal producer goods, but the finished products of metal crafts such as pewter manufacture or ironmongery have been included in the crafts and manufactures section. Where finished metal products were obviously most closely allied with the heavy end of the metals industries, such as iron hammers or brass battery ware, these have been included in the metals category. The wood and wood products category includes all of the direct products of the timber trades, such as laths, hoops and hogshead staves; but goods which were the products of separate craft activities, such as barrels, chairs or twiggen cradles, have been included in the crafts group. Textiles has been taken to include all kinds of textile material, including haberdashery and yarns, but not the primary raw materials of the industry, such as teazles and wool, which have been judged to be agricultural, nor consumer goods such as caps and apparel, which have been included with other crafts. Another difficult boundary is that between agriculture and food. The general rule here has been that if food or drink was usually prepared for consumption away from the farm, for example bread or malt, it is cited as a food; but if it was usually prepared on the farm or traded in a raw state, like cider or wheat, it is regarded as agricultural. Similarly, calfskins are treated as agricultural produce but tanned leather as a craft.

The most important points to be aware of in examining the tables relate to commodities of outstanding stature in the river trade which make an appreciable contribution to the figures. The most important of all is that salt has been judged to be an extractive mineral, not a food or a manufacture. The next most important is that cheese, cider and wool have been regarded as agricultural products because they came direct from the farm in most cases at this time rather than from separate processing centres. Also regarded as agricultural have been some apparently anomalous raw materials of exotic organic origin which do not fit any other category better, such as elephants teeth (ivory) and turtleshell; but these are relatively rare and probably do not affect the figures materially. It should be noted that the food and drink category contains several products not readily associated with it which are of major importance, namely malt, tobacco and apothecary[17].

The tables below provide the numbers of voyages for each sample year with cargoes including goods of each class. These are also expressed in terms of the proportion of all voyages in each year. However it should be noted that the tables in no way give an account of the numbers of consignments: some voyages may have included several consignments of different goods of the same class, but these are counted only once. Nor do the tables give any conception of the size of consignments: a cargo

containing half a ton of bar iron is given equal value in the tables to a cargo with twenty tons. It should also be noted that the figures for the years after the decline in quality of the Port Books in the late 1720s cannot be used effectively here, and are included only for their relevance to understanding of the Port Books. These qualifications being appreciated, the tables provide instructive data about the prevalence of commodities, and about variations between upstream and downstream trade and over time.

Tables 4.4 and 4.5 show for all the sample years the numbers of voyages downstream through Gloucester recorded in the Port Books carrying each class of commodity, and the proportion of all voyages these represented in each year. The only category which is not represented to an appreciable scale is commodities from the sea. Those shipments which do appear were generally barrels of herrings being returned, presumably because they were unmerchantable.

Agricultural products and food and drink stand out in these tables as consistently well represented. They figure as by far the most important downstream trades in 1637 and 1647. Food was present at all times on from about half to three quarters of downstream voyages. The food trades seem to have grown in proportion with the overall trade of the river, growth being considerable in the seventeenth century and levelling out and declining slightly in relation to overall trade in the early eighteenth. By far the most important commodity in this category throughout the period was malt, but other important contributors to the trade were cheese and bacon. The trade in agricultural produce seems to have leapt from about one third to half of voyages in the early seventeenth century to two thirds to three quarters of all voyages downstream from 1666, most notably consisting of grain crops, cider and skins. Both the food and the agricultural produce trades seem to have been greatly reduced in the year 1674, but more or less maintained their share of the river trade.

The picture of trade in metals is surprising given the heroic expectations of the metals industries in an only slightly later period. There seems to have been a sharp increase in the importance of the metal trades from the early to the late seventeenth century, they seem then to have remained fairly stable in absolute terms but declined slightly relative to overall trade during the first quarter of the eighteenth century. Virtually all of this trade was in iron or ironwares, and the figures are broadly consistent with Riden's estimates of the output of pig iron, which show a steady increase in production from the early to mid seventeenth century, followed by decline to the 1690s and then gradual growth into the 1720s[18]. That the proportion of all voyages carrying metal trade goods remains almost consistently between 40 and 50%, despite the wide range of metal goods included in the category, conflicts with the common image of the

Tables 4.4 and 4.5

Numbers and percentages of recorded downstream voyages carrying each class of commodity

Number of voyages out of Gloucester
by class of commodity
All sample years

	Number of voyages including each class of goods								
Year	Total	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
1637	184	5	0	31	25	0	87	98	0
1647	132	16	1	28	14	2	42	95	0
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	259	132	63	160	142	80	177	140	1
1674	208	105	57	159	103	100	148	99	2
1684	252	101	54	203	111	126	185	173	7
1697	357	155	230	240	185	116	272	250	7
1699	332	153	199	260	200	200	226	237	8
1704	331	145	200	223	173	179	254	236	4
1705	343	162	189	229	161	160	243	227	2
1706	331	158	189	226	175	173	232	237	2
1707	386	156	226	245	188	191	289	278	9
1708	394	172	261	267	177	188	284	260	1
1715	390	179	242	290	218	209	273	240	1
1722	407	164	259	319	200	192	273	205	9
1733	284	113	261	157	105	83	171	69	3
1741	297	74	215	182	102	61	200	105	3
1752	255	86	243	166	86	44	148	110	4
1765	151	44	123	90	31	22	60	6	1

Percentage of voyages out of Gloucester
with each class of commodity
All sample years

	Percentage of voyages including each class of goods								
Year	Total	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
1637	184	3	0	17	14	0	47	53	0
1647	132	12	1	21	11	2	32	72	0
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1666	259	51	24	62	55	31	68	54	0
1674	208	51	27	76	50	48	71	48	1
1684	252	40	21	81	44	50	73	69	3
1697	357	43	64	67	52	33	76	70	2
1699	332	46	60	78	60	60	68	71	2
1704	331	44	60	67	52	54	77	71	1
1705	343	47	55	67	47	47	71	66	1
1706	331	48	57	68	53	52	70	72	1
1707	386	40	59	64	49	50	75	72	0
1708	394	44	66	68	45	48	72	66	0
1715	390	46	62	74	56	54	70	62	0
1722	407	40	64	78	49	47	67	50	2
1733	284	40	92	55	37	29	60	24	1
1741	297	25	72	61	34	21	67	36	1
1752	255	34	95	65	34	17	58	43	2
1765	151	29	82	60	21	15	40	4	1

Severn. This is that it was overwhelmingly an artery of the iron industry, and has perhaps been influenced by the plentiful evidence left by the Severn and Wye iron partnerships and by the outstanding importance of Shropshire iron production in the later eighteenth century. Even with the addition of iron traffic which was not recorded because it was between the Stour Valley and the Forest of Dean or the Stour Valley and Shropshire, it is unlikely that the proportion of voyages with iron would be more than, say, two thirds. The use of the Port Books in this way allows the trade to be seen in context for the first time.

The extractive minerals trades present one of the most impressive pictures of growth of all the trades, both in terms of the numbers and the proportions of voyages that carried them. They were virtually non-existent in the downstream trade of 1637 and 1647, but grew to be present on about a quarter of all voyages during the second half of the century. Some of this apparent increase may have been connected with changes in recording, but this cannot be said of the unparalleled growth which took place in the 1690s, with the number of downstream voyages a year with minerals growing from the previous fifty or sixty to around two hundred or more: representing nearly two thirds of all the voyages downstream in most years from then until the 1720s. The vast majority of this increase seems to have been created by the sudden growth of the salt trade with the reorganisation of the Droitwich industry in the 1690s[19], but was also contributed to by the growth of trade in pot clay[20], presumably for making crucibles and furnace linings that were increasingly needed for the expansion of metallurgical industries with their de-regulation in the 1690s[21]. The proportion of voyages with minerals grew even higher in subsequent records, as salt was one of the main commodities that seems always to have been recorded carefully after the records began to decline. Coal seems always to have played a small part in this trade, although the one sample year in which the downstream trade in coal was of a large scale, 1697, can be seen to have had an impact on the figures. They suggest that the importance of the downstream coal trade has been greatly over-emphasised as far as trade through Gloucester was concerned. This is confirmed by Table 4.6, which shows calculations from the Port Books of downstream shipments of coal in tons. In the period before the development of the salt trade, but when the coal trade of Shropshire was already rapidly developing[22], it was not so great as to make extractive minerals a major part of the river trade, belying, as far as trade below Gloucester was concerned the view that coal was 'the most common freight' on the Severn[23]. At this point, in fact, the upstream traffic in coal was greater than that downstream. This may have been Bristol coal coming upstream because it was cheaper here than that brought downstream from Shropshire, or it may have been anthracite brought indirectly from

Table 4.6

Recorded downstream coal trade (in tons)

	Coal shipped outward from Gloucester by home port								
	Gorge	Bridgnorth	Bewdley	Worcester	Evesham	Upton	Tewkesbur	Other	TOTAL
1637									0
1647									0
1656									0
1666						2			2
1674	15	18	56	84		28	35		236
1684	2	60	5	1					68
1697	495	392	82	70	8	2	36	22	1107
1699									0
1704									0
1705		67	1						68
1706									0
1707									0
1708									0
1715	20	51	19					33	123
1722	60	15	12					30	117
1733								134	134
1741								16	16
1752								44	44
1765								30	30

Pembrokeshire to be used in malting[24]. This does not, however, deny its supreme importance to the upper parts of the Severn. The majority of the growth in the minerals trades later seems to have been caused by salt and pot clay carriage.

The downstream trades in wood seem to have been surprisingly large contributors to the overall growth in trade during the period. The numbers of voyages with wood grew from virtually nil in the early seventeenth century to a level of around one hundred a year in the later seventeenth century, and around two hundred a year from 1699 onwards. The growth in this recorded trade to 1666 is largely accounted for by the differences in recording practices for this commodity which occurred at that date, but the continuing growth was still impressive. Wood represented about one third of all voyages by 1666 and usually around half from 1674 onwards. The most important goods involved were timber, timberstuff and lath. It is particularly surprising how much traffic in these commodities passed downstream through Gloucester given the proximity to markets beyond that point of the Forest of Dean. Clearly, demands for timber at Bristol were such that more localised supplies, even though they were large, had to be supplemented by long-distance trade.

Crafts and manufactures and textiles also made a conspicuous contribution to growth in the scale and diversity of downstream trade. Both took enormous leaps in scale from the earlier to the later seventeenth century, again partly due to improvements in recording, but unlike minerals and wood they were already present on between around 10 and 20% of voyages each. From the later seventeenth century textiles were present on about half of all voyages downstream throughout the remainder of the period studied. The most important of these were linen and Manchester wares, both of which were present also in earlier years, but increased markedly in volume. Crafts and manufactures grew to a maintained level of two thirds to three quarters of all voyages. These consisted of an increasing variety of goods; but the most important growth was in the leather trades, glass and ceramics. Downstream shipments of glass, for example, grew from 35 voyages a year in 1666 to 90 in 1722. Downstream shipments of clay tobacco pipes grew from nil in 1666 to 38 by 1722, carrying some 3,400 gross. Smaller-scale crafts also grew appreciably, though they may have contributed a smaller part of the overall change in the crafts and manufactures class. For example, the downstream trade in chairs increased from 132 in 1666 to 3,000 in 1722.

The upstream trade by class is shown in Tables 4.7 and 4.8. It is noticeable that all categories of goods have an appreciable presence at all times. This presumably reflects the fact that goods from all over England and the colonised world were finding their way back into the markets of the Severn hinterland, and these diverse goods came from

Tables 4.7 and 4.8

Numbers and percentages of recorded upstream voyages carrying each class of commodity

Number of voyages into Gloucester
by class of commodity
All sample years

	Number of voyages including each class of goods								
Year	Total	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
1637	83	39	20	26	2	0	39	31	8
1647	65	36	18	39	7	3	51	55	15
1656	323	100	151	148	138	8	117	225	99
1666	186	77	83	103	99	2	127	113	41
1674	129	51	53	18	13	4	74	67	5
1684	263	137	118	161	105	35	122	189	63
1697	235	131	102	132	93	40	112	155	75
1699	294	152	105	183	99	68	148	186	70
1704	252	142	83	141	104	52	138	160	63
1705	265	161	95	147	88	63	144	172	63
1706	253	156	90	147	85	63	124	166	75
1707	245	137	73	145	81	65	116	169	68
1708	272	171	70	146	69	47	127	186	68
1715	225	144	68	135	77	63	133	146	60
1722	271	171	73	173	108	69	157	182	68
1733	71	20	38	34	21	18	34	31	11
1741	77	19	41	16	10	8	37	14	2
1752	67	15	34	12	21	3	27	9	5
1765	86	20	47	22	15	14	48	23	3

Percentage of voyages into Gloucester
with each class of commodity
All sample years

	Percentage of voyages including each class of goods								
Year	Total	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
1637	83	47	24	31	2	0	47	37	10
1647	65	56	28	60	11	5	79	85	23
1656	323	31	47	46	43	3	36	70	31
1666	186	41	45	55	53	1	68	61	22
1674	129	40	41	14	10	3	57	52	4
1684	263	52	45	61	40	13	46	72	24
1697	235	56	43	56	40	17	48	60	32
1699	294	52	36	62	34	23	50	63	24
1704	252	56	33	56	41	21	55	64	25
1705	265	61	36	56	33	24	54	65	24
1706	253	62	36	58	34	25	49	66	30
1707	245	56	30	59	33	27	47	69	28
1708	272	63	26	54	25	17	47	68	25
1715	225	64	30	60	34	28	59	65	27
1722	271	63	27	64	40	26	58	67	25
1733	71	28	54	48	30	25	48	44	16
1741	77	25	53	21	13	10	48	18	3
1752	67	22	51	18	31	5	40	13	8
1765	86	23	55	26	17	16	56	27	4

all categories. However it is also the case that rather more categories of goods appeared on only a minority of voyages than was the case for downstream trade - probably bearing out the expectation that the imports of the region consisted of many different things of minor importance, rather than a few fundamental necessities imported on a large scale. It is also noticeable that there appears to have been much less change between the earlier and later seventeenth century than there was in downstream trade, although many goods did change in their relative presence.

Food and drink was almost consistently the group which was present on the largest number of voyages upstream, usually being represented on a half to two thirds. The actual number of voyages involved grew substantially, but approximately in pace with the growth of upstream voyages altogether from 31 and 55 per year in 1637 and 1647 respectively to about four or five times those levels in the later seventeenth and early eighteenth centuries. It should be noted that the most important contributors to this upstream trade were not basic foods but tobacco, grocery and foreign wines, and also saltery and apothecary on a significant but lesser scale. Tobacco is discussed more fully in Chapter 6. The fact that so many of these were relative luxuries may account for the low number of voyages with them during the depression of 1674, when they were less than half of their more normal level. Although the proportion of voyages including these goods is high, at around 50 to 70%, it is in a sense surprising that they were not more ubiquitous, given the expectation that most vessels returning from ports like Bristol, Chepstow or Bridgwater might have had the opportunity and reason to collect small quantities of high value goods to help pay for their return voyages. The fact that one third to one half of all recorded upstream voyages did not return with any tobacco or wine or grocery is all the more surprising when it is remembered that usually some third of upstream voyages seem not to have been recorded at all as they had no cargo worth considering by the Customs officers. This emphasises, perhaps, that whilst most of the downstream cargoes were shipped in large quantities, less in bulk was imported to the region, and competition for their carriage may have been intense.

The products of the sea that were brought upstream were mainly also for food: chiefly herrings and white fish; but kelp for glass making was also brought upstream on up to a dozen voyages a year[25]. The numbers of voyages with such products was very low in the years of strife, such as 1666 and 1674, but grew to a remarkably steady range of between about 60 and 75 a year from 1684 to 1722, representing usually about one quarter of all voyages. The regularity of trade in fish perhaps indicates its importance as a supplement to diet in the Severn region and the fact that there was no difficulty in marketing it far inland. However the damage to the trade in the depression year of 1674 and before suggests that it may well have been a commodity that could be dispensed

with relatively easily in times of poverty, or else it was badly affected by war and the dangers of impressment. Whereas the number of voyages with food and drink was one third of what it was in 1684, the number with sea produce was one twelfth.

Metals and crafts and manufactures had a consistently high presence on upstream voyages, but usually on only around half of all voyages each. As in the case of food, the growth between the earlier and later seventeenth century seems to have been considerable, but starting from an established base.

As was the case for the downstream metals trades, the upstream trade seems to follow a pattern of growth in the mid seventeenth century followed by a period of relative decline and then a gradual recovery and advancement in the last quarter of the seventeenth and first quarter of the eighteenth centuries. A particular surge is apparent in the 1690s owing to the increase in the production of non-ferrous metals industries following their deregulation, as well as the gradual growth of the iron industry. The surge in non-ferrous metals seems to have been over by the 1720s as many of the new upstream enterprises failed, but the iron industry continued to grow effectively and was advanced further from the early years of the eighteenth century by Abraham Darby's success in producing cast iron using coke[26]. The upstream metals traffic consisted most notably of bar iron and cast iron from the Bristol and Wye valley markets supplying the midlands iron industry, lead and shot, brass and battery ware of various kinds, copper from Redbrook, and, on a smaller scale, wire and tinplate. Although more iron traffic must have been carried than was recorded, because of the place of the Severn ports of the Forest of Dean in the trade, the essentially symbiotic relationship of the metals trades in the regions above and below Gloucester is supported by the approximate balance between numbers of upstream and downstream voyages with the commodities in the late seventeenth and early eighteenth centuries.

The crafts and manufactures brought upstream were many and varied, but the most important were oil and soap, pitch and tar, the many other goods being in small quantities. Given that Bristol was a centre for so many manufactures and a market for so many others, it is surprising to find that this class of goods appears on many fewer voyages upstream than down. Whereas in the early and mid seventeenth century there seems to have been an approximate trade balance in crafts or manufactures, by the end of the seventeenth century there was a distinct surplus in favour of the Severn hinterland, which was continuing to grow: in 1705 there were one and a half times as many downstream as upstream voyages, and by 1722 there were nearly twice as many. This indicates the growing importance to the midlands economies of crafts and manufactures such as those discussed above.

Voyages upstream with agricultural produce were always numerous and

represented for most of the period around half of all voyages. The main types of produce being brought upstream were wool, grain crops and hides and skins. Of these, the least important were the grain crops, appearing on less than ten percent of upstream voyages, apart from exceptional years (Table 4.9). Far the more important products were the skins and wool which were being consumed in great quantities by the leather and textile industries of the Severn hinterland. Whilst the Severn region was far from self-sufficient in agricultural produce as a whole, it seems that its needs were for additional supplies to its successfully expanding crafts and industries rather than for arable produce. There was a continuous surplus of outward trade in grains and other field crops for human consumption[27], albeit that there was considerable fluctuation from year to year to account for differences in harvests, as shown in Table 4.9[28].

The recorded imports of wood into the Severn valley were slight at the beginning of the period, with only a few voyages a year before 1684, though this may be because it was not recorded rather than not carried. However, the forests of the midlands must have supplied most of the timber needs of the region. The trade in wood upstream seems to have begun to change radically in the last two decades of the seventeenth century as the number of voyages with wood grew to 35 a year in 1684 and a level of 68 in 1699 which was more or less maintained to the end of the period of effective recording in the late 1720s. Most of this increase, which brought upstream voyages with timber to a broadly comparable level with downstream, can be explained by the importation of deals for specialist uses, particularly in building. This seems to *have grown out of the increasing timber prices of the* seventeenth century[29] and the perceived advantages of using soft woods, and continued in the eighteenth century with steadily growing national imports[30]. The growth was also contributed to, to a smaller degree, by increased trade upstream in lath, staves and hoops from the Forest of Dean, probably as much owing to the availability of spare capacity on vessels passing between Gloucester and Chepstow as to shortages of such products in the Severn basin.

Textiles were a far less important component of upstream than of downstream trade. From the mid seventeenth century they were on around one third of upstream voyages, compared with about half downstream; but this was only 30-40 voyages a year compared with 150-200 downstream. The textiles carried upstream were usually serge or linen, but could include other woollen cloths, haberdashery or silkwares. It seems likely that, like serge, these were mainly textiles of varieties that were not usually made in the Severn hinterland, unlike the linen, Manchester ware, Kidderminster ware, yarn and woollen cloth which were typical of the downstream trade. This trade, constituting the more expensive goods, seems to have been badly damaged by the difficulties of 1674, when it fell to less than one seventh of the normal number of voyages.

Table 4.9

Recorded field crops traffic, upstream and downstream (in bushels)

Voyages out of Gloucester with field crops for human consumption

Year	Voyages with grain	All voyages	Percent with grain	Quantity in bushels	Mean shipment bushels
1637	100	184	54	62006	620
1647	102	131	78	45474	446
1656	N/A	N/A	N/A	N/A	N/A
1666	137	259	53	69552	508
1674	104	208	50	52323	503
1684	161	252	64	75542	469
1697	227	357	64	112360	495
1699	203	332	61	72767	358
1704	*212*	*331*	64	71348	337
1705	210	343	61	76634	365
1706	216	331	65	76408	354
1707	263	386	68	110042	418
1708	243	394	62	90145	371
1715	208	390	53	105969	509
1722	152	407	37	91261	600
1733	24	285	8	3095	129
1741	*91*	*297*	31	104379	1147
1752	80	257	31	20089	251
1765	4	152	3	512	128

Voyages into Gloucester with field crops for human consumption

Year	Voyages with grain	All voyages	Percent with grain	Quantity in bushels	Mean shipment bushels
1637	7	83	8	430	61
1647	21	65	32	6338	302
1656	20	323	6	3371	169
1666	16	186	9	10762	673
1674	20	129	16	8188	409
1684	17	263	6	3980	234
1697	10	235	4	817	82
1699	58	294	20	19314	333
1704	9	252	4	4017	446
1705	13	265	5	5281	406
1706	11	253	4	4182	380
1707	6	245	2	1943	324
1708	8	272	3	1208	151
1715	18	225	8	1566	87
1722	27	271	10	9205	341
1733	10	71	14	4260	426
1741	10	77	13	2732	273
1752	1	67	1	800	800
1765	14	86	16	12000	857

Finally, the upstream trade in extractive minerals, it should be noted, was considerably smaller than that downstream in terms of numbers of voyages: representing usually less than one hundred per year compared with 200-260 for the downstream trade in the early eighteenth century. It was also much smaller in proportional terms, consisting usually about one third of upstream voyages. The upstream and downstream trades were much more equally matched before the 1690s, and the principal reason for the later discrepancy was certainly the success of the downstream salt trade from the Droitwich field. The upstream minerals trade consisted of salt before this date, but only a little rock salt afterwards[31]. It also consisted of coal being brought from Bristol, some of which may have come indirectly from Tenby or Milford, although this trade fluctuated heavily. Other than these, the trade was made up by small quantities of such goods as tobacco pipe clay, magnis for use in pottery glazes, and callamy for making brass, though each of these tended to appear and disappear according to the fortunes and supplies of industries with which they were connected higher up the Severn. The callamy trade, for example, began around 1697 and had come to an end by 1714, though in its peak years between about 1705 and 1708 it amounted to 250 tons a year. This burst of activity seems to have been related to the short-lived establishment of brass making works at Coalbrookdale and possibly elsewhere in the region[32].

The tables of upstream and downstream trade by class reveal several points concerning more general aspects of the regional economy and the nature of the river trade. The first point is that the tables show great and regular growth in the downstream trades in loosely 'industrial' products, namely metals, crafts and manufactures, textiles and minerals. In fact there was growth in all the downstream sectors, but these grew conspicuously, particularly between the middle and the late seventeenth century. In many of them growth was maintained in parallel with the overall growth of recorded trade up until the late 1720s. There was growth also in the upstream trade in these commodities, but the growth started from a higher base, was not so rapid and did not reach such high numbers of voyages.

By around 1700 a much broader pattern of trade had been established than had existed before, with all classes of commodity being represented on a range of between 40 and 80% of downstream voyages (excluding sea produce) and between about 20 and 70% of upstream voyages. Surprisingly, the inward traffic was *less* varied by this measure, even though it consisted of many goods from all over the world. The reason is principally that the levels of trade in extractive, textile, crafts and wood categories in particular were considerably lower in upstream than downstream trade. The tables can

be said to show, above all, that the Severn hinterland economy was weak in the mid seventeenth century, exporting only agricultural produce and food on a large scale; but that by the beginning of the eighteenth century it was a strongly diversified exporting region, with an appreciable level of outward trade under every heading except fishery.

It is clear that different sectors were affected in different ways by difficult economic conditions. The upstream trade was badly damaged by both the disturbances of 1666 brought about by plague, the fire of London and war, and the depression and war of 1674. Some of the upstream trade sectors were damaged much more badly than others. Trade in metals, minerals, agricultural produce and food were about halved in 1674 compared with their 1684 levels. However the trade in the crafts, textiles and wood sectors fell to around a tenth, and the trade in sea produce even further. It seems clear that whilst relatively organised or essential trades in salt, iron, food and fuel were badly damaged, the trades in non-essential commodities such as high-quality textiles, specialist crafts and deal boards were damaged much more drastically. The greater stability of the downstream trade in these difficult years indicates the more essential nature of the Severn hinterland's products, not just that it was less susceptible to trading difficulties at sea. All sectors of trade were dimmed to some extent, but the decline even in crafts, textiles and wood was relatively small. The mainstay of the downstream crafts trades in the late seventeenth century were goods such as leather, glass and earthenware, whilst the textiles trades were dominated by cheap linens and Manchester wares and by woollen cloth, and the timber trade was in basic timber and timberstuff for a wide variety of uses. It seems that the Severn hinterland economy was not only becoming diverse, but it was also already relatively strong.

Having examined the trade of the river as it varied from year to year in the light of the classified breakdown of commodities, the same classification can be applied to a geographical analysis. It would be impractical to examine and comment on every sample year in terms of the geographical patterns of trade. The five years 1704-8 have therefore been analysed in the form of tables arranged by the same geographical groupings as the previous chapter. All five have been aggregated to provide single indices of trade and smooth out variations from one year to another. This analysis is divided into sections on trade relations with ports of destination or departure below Gloucester, and the trade of home ports on the Severn.

iii. Trade beyond Gloucester

Table 4.10 shows outward trade from Gloucester by destination under each of the commodity classifications for the five years 1704-8. The table contains three parts.

The first shows the numbers of voyages to or from each port group carrying each class of commodity. The second shows these figures as percentages of all voyages to or from each port group; and the final part shows the same figures as percentages of all the voyages with each type of commodity in or out of Gloucester. The table thus indicates both the importance of each commodity trade to each port grouping, and the importance of each port grouping to the total trade in each commodity type. Table 4.11 shows inwards trade to Gloucester by port of departure for each class, following a similar format.

The fact immediately apparent from these tables is the overwhelming dominance of the trade both to and from Gloucester of the port of Bristol. Bristol received a large majority of the shipments downstream from Gloucester under every single commodity heading. The size of this majority ranged from 65% of extractive minerals to 89% of textiles, indicating the enormous importance of the city as both a consuming and marketing centre of the Severn valley's trade. The relatively low share of mineral consumption compared with other commodities is explained by the fact that the majority of this trade was in salt, which was in great demand by the fishing ports of the Bristol Channel as well as by Bristol itself. Also, the trade in salt was of a bulk which justified direct trade whereas smaller goods might more effectively have been marketed in Bristol and sent onwards to such places[33]. Moderate amounts of pot clay were also sent to Bristol which helped to maintain its total share of the minerals trade. For all other commodity types, Bristol was the destination for even more than two thirds of voyages. It took around three quarters of all voyages carrying metals, crafts or agricultural produce. Bristol was an important centre for the marketing and manufacturing of iron, and nearly half of all voyages to Bristol from Gloucester carried metals. It was also an important market for crafts and manufactures, and 69% of voyages to Bristol carried these. As an urban centre of large population, Bristol was both an important market and an important direct consumer of both agricultural produce and food and drink. Around 80% of all voyages to Bristol therefore carried one or both of these two classes of goods, in the forms of wheat, malt, cheese, bacon, butter, barley, hops and other produce. Finally, in the cases of textiles and wood, only around 59% (still a large proportion) of all voyages from Gloucester to Bristol carried these, but as in the case of food and drink, these voyages represented nearly nine tenths of all the downstream voyages carrying those commodities. These were goods for which it seems to have been even more difficult than it was for crafts, metals and agricultural produce to circumvent the great vortex of the Bristol market.

Bristol also dominated the upstream trade to Gloucester for every commodity type, in fact to an even greater extent than it dominated the downstream trade. Soap,

Table 4.10

Numbers and percentages of recorded downstream voyages carrying each class of commodity by destination

Number of voyages out of Gloucester with each class of commodity
by destination
1704-8 inclusive

	Number of voyages including each class of goods								
Destinatio	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total
Wye	29	72	54	3	10	40	31	0	88
Bristol	607	693	902	771	769	1026	1052	8	1300
S.Wales	29	59	28	2	6	27	15	0	86
S.W.Wales	2	14	8	1	0	27	1	0	33
Somerset	120	156	140	84	82	102	88	0	162
Dev&Corn	0	26	12	0	4	19	11	1	32
Other	1	1	6	0	0	27	0	0	29
Cross-Reg	4	38	32	5	11	25	30	0	42
Unknown	5	7	9	6	10	10	9	0	14
TOTAL	790	1064	1186	868	887	1303	1235	9	1786

Number of voyages out of Gloucester with each class of commodities
expressed as a percentage of the voyages to each destination
1704-8 inclusive

Destinatio	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total voyages
Wye	33	82	61	3	11	45	35	0	88
Bristol	47	53	69	59	59	79	81	1	1300
S.Wales	34	69	33	2	7	31	17	0	86
S.W.Wales	6	42	24	3	0	82	3	0	33
Somerset	74	96	86	52	51	63	54	0	162
Dev&Corn	0	81	38	0	13	59	34	3	32
Other	3	3	21	0	0	93	0	0	29
Cross-Reg	10	90	76	12	26	60	71	0	42
Unknown	36	50	64	43	71	71	64	0	14
									1786

Number of voyages out of Gloucester with each class of commodities
by destination, expressed as a percentage of all voyages with each class
1704-8 inclusive

Destinatio	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	
Wye	4	7	5	0	1	3	3	0	
Bristol	77	65	76	89	87	79	85	89	
S.Wales	4	6	2	0	1	2	1	0	
S.W.Wales	0	1	1	0	0	2	0	0	
Somerset	15	15	12	10	9	8	7	0	
Dev&Corn	0	2	1	0	0	1	1	11	
Other	0	0	1	0	0	2	0	0	
Cross-Reg	1	4	3	1	1	2	2	0	
Unknown	1	1	1	1	1	1	1	0	
Total voya	790	1064	1186	868	887	1303	1235	9	1786

Table 4.11

Numbers and percentages of recorded upstream voyages carrying each class of commodity by port of departure

Number of voyages into Gloucester with each class of commodity
by port of departure
1704-8 inclusive

	Number of voyages including each class of goods								
From	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total
Wye	150	39	64	0	77	69	9	2	154
Bristol	561	346	642	425	208	536	829	326	1030
S.Wales	40	8	1	1	1	10	0	0	47
S.W.Wales	7	15	3	0	0	10	3	2	25
Somerset	2	1	4	0	1	14	1	2	15
Dev&Corn	0	3	4	0	0	2	2	1	7
Other	0	0	0	0	0	0	0	0	0
Unknown	8	1	7	2	4	6	8	3	9
TOTAL	768	413	725	428	291	647	852	336	1287

Number of voyages into Gloucester with each class of commodity
expressed as a percentage of voyages from each port of departure
1704-8 inclusive

From	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total voyages
Wye	97	25	42	0	50	45	6	1	154
Bristol	54	34	62	41	20	52	80	32	1030
S.Wales	85	17	2	2	2	21	0	0	47
S.W.Wales	28	60	12	0	0	40	12	8	25
Somerset	13	7	27	0	7	93	7	13	15
Dev&Corn	0	43	57	0	0	29	29	14	7
Other	0	0	0	0	0	0	0	0	0
Unknown	89	11	78	22	44	67	89	33	9
									1287

Number of voyages into Gloucester with each class of commodity
by port of departure, expressed as a percentage of all voyages with each class
1704-8 inclusive

From	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
Wye	20	9	9	0	26	11	1	1
Bristol	73	84	89	99	71	83	97	97
S.Wales	5	2	0	0	0	2	0	0
S.W.Wales	1	4	0	0	0	2	0	1
Somerset	0	0	1	0	0	2	0	1
Dev&Corn	0	1	1	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Unknown	1	0	1	0	1	1	1	1
Total voya	768	413	725	428	291	647	852	336

groceries, wine, tobacco and lead shot, for example, were hardly ever carried by boats originating from other ports. This is scarcely surprising given that soap boiling, sugar refining and lead manufacture were industries for which the city was renowned, and that it was one of the greatest overseas trading centres in England. The commodity trade Bristol dominated least seems to have been wood, since it had no forest near it. Even in this case, however, 71% of all upstream voyages with wood came from Bristol, as it had a powerful trade in deals imported from Norway and the Baltic. No other port achieved even the smallest regular share in the trades upstream in food, textiles or even sea produce. Even though Bristol was not a great fishing port in its own right it managed to capture 97% of all upstream voyages with sea products to Gloucester.

The only other places which achieved an appreciable share of direct upstream traffic to Gloucester were the ports of the River Wye, which managed to grasp a 20% share in all the upstream voyages with metals and 26% of all the upstream voyages with wood. This is not surprising given the relation of Chepstow and its river ports to the iron and non-ferrous metals industries of the Wye valley and the timber production of the Forest of Dean; indeed it is only surprising that the competition with Bristol was not more effective. The importance of the metal and wood trades to the Wye can be seen by the fact that 97% of all voyages from thence to Gloucester carried metals and half carried wood. The Wye valley was also the only location to achieve over a five percent share in any other trade upstream to Gloucester. It achieved some importance as a place of departure for upstream shipments of crafts, agricultural produce and minerals, providing about one tenth of all voyages with these, chiefly through producing millstones (counted as extracted minerals), cider, and a variety of minor crafts, most of which were concerned with wood. The Wye ports had no appreciable role in exporting food, textiles or fish upstream.

As destinations, the Wye ports received a surprisingly small share of goods compared with their role as places of departure. Only 4% of downstream voyages with metals went to Chepstow, despite the region's importance in the metals industries. These, principally iron hammers and other ironware, were carried on only one third of the voyages from Gloucester, suggesting that the Wye valley exported iron producer goods to Gloucester and received only a small number of finished products. Crafts and manufactures were more important in downstream trade than metals, with nearly two thirds of voyages from Gloucester bringing goods such as clay pipes, chairs, and linseed oil; but these still only represented 5% of downstream trade in such commodities from Gloucester. An impressive 82% of voyages from Gloucester to the Wye carried extractive minerals: primarily salt for fisheries and pot clay for the metallurgical industries, representing 7% of the downstream trade in minerals. Other than these

commodities, the Wye received quite widely mixed cargoes. Even exporting wood to the area beside the Forest of Dean was a possibility, and lath or timber were carried on 11% of incoming voyages from Gloucester. Only textiles and sea produce were negligible as categories of Gloucester to Wye valley trade. Even though it held a minor share of trade compared with Bristol, the proximity of the Wye valley to Gloucester and the special connection promoted by the metals trades, created a regular trade of some importance between the two regions.

Only one other region was of importance in attracting a wide range of downstream shipments from Gloucester, namely the Somerset ports: mainly Bridgwater and, to a lesser extent, Minehead. These ports seem to have provided a good general market for Severn valley produce. Between 7 and 15% of voyages out of Gloucester carrying goods of each commodity type went to Somerset (with the exception of sea products). The most important of these trades was in extractive minerals, composing 15% of all downstream shipments with such goods and 96% of all voyages to Somerset from Gloucester[34]. This traffic consisted almost entirely of salt for the fisheries. The same proportion of downstream trade in metals also reached Somerset, making up three quarters of voyages from Gloucester to the region and consisting almost entirely of iron and ironwares. Some 12% of the voyages with crafts and manufactures from Gloucester reached Somerset, and these were 86% of those incoming from the Severn valley. Many products were involved, but the most prominent were oil, pins, chairs, bricks and clay pipes. The other commodity types were carried on between about half and two thirds of voyages from Gloucester to Somerset, the most important being goods such as timberstuff, barley, cider, cheese, Kidderminster stuff and thread. It is notable also that even cider and wool, which were locally produced, were carried from Gloucester to Bridgwater.

Wool was one of the most important of commodities carried upstream from Bridgwater to Gloucester. This two way traffic shows that wool of different types was being exchanged between the regions. Agricultural produce was included on 93% of such journeys and composed 2% of all upstream shipments of that commodity type to Gloucester. In addition to wool, this included wheat, beans and barley on occasion. About a quarter of upstream voyages from Somerset took various crafts, and 13% carried metals and sea products respectively, but none of these registered as significant in terms of total trade into Gloucester. Even sea produce achieved only 1% of all voyages arriving at Gloucester with that class of goods. The trade in other classes from Somerset to Gloucester was insignificant even in terms of the proportion of voyages from the county which carried them. It is clear that whilst Somerset provided a good market for many goods carried to it from the Severn valley, the principal reasons for the

trading connection to exist directly were to provide salt for fisheries and to return wool for the textile industries.

Devon and Cornwall had very little direct trading connection with Gloucester. The total number of voyages amounted to only 32 from Gloucester and seven back in all five years 1704-8. The ports of these counties did achieve a significance in the outward mineral trades, as salt, used primarily in curing fish, was being carried on 81% of voyages to the region, amounting to 2% of all downstream voyages with minerals. About two thirds of vessels going to the south-west took agricultural produce such as grain or cheese, which made up 1% of all downstream shipments of such produce. About one third of vessels carried crafts such as pipes and chairs or food such as bacon or malt, these trades also representing just 1% of downstream trade in each class. 13% of vessels carried wood, but this was insignificant in terms of total downstream trade in that commodity. Apart from these, no other goods of importance to the ports of Devon and Cornwall seem to have been brought from Gloucester. The upstream connection was of even less importance. Of the seven voyages with recorded goods back to Gloucester, four carried crafts and manufactures and three carried pipe clay. The mediating role of Bristol seems to have been important in the return of goods to the Severn valley, suggesting that the salt trade was the *raison d'etre* of the direct connections that took place. Both tin and tobacco pipe clay, which came from the two counties, were more often to be found coming to Gloucester through Bristol.

South Wales had a limited importance in a few trades downstream from *Gloucester. It took 6% of all voyages with extractive minerals*, mainly of salt but also some pot clay for metallurgical uses. The importance of this trade to the receiving region, however, is indicated by the fact that minerals were carried on 69% of incoming voyages from Gloucester. South Wales also took 4% of all the metals trade, largely of iron and ironwares, carried on one third of incoming voyages from the Severn. Similarly, one third of voyages carried crafts or manufactures, notably pipes and chairs, but these represented only 2% of downstream traffic in such classes of goods. Other than the 17% of incoming voyages that carried food or drink (usually malt or cider), no other commodities were of any importance in the downstream trade to South Wales. The return trade was also very narrow in its economic base, showing the relative poverty of South Wales at this time. Some 85% of boats going upstream had metals, most notably bar iron or iron plates from Newport, and this made up 5% of the total upstream metals trade. Coal was carried on 17% of voyages, making 2% of upstream trade in extractive minerals. Agricultural produce, mainly in the form of oats, peas and beans, was carried on one sixth of upstream voyages, also amounting to 2% of the total. Upstream trade from South Wales did not figure under any other heading, even

food or fishery produce.

Lastly, South West Wales was of little importance. In upstream traffic it produced 4% of all voyages with minerals owing to its export of stone coal or anthracite, which had specially high values in malting and certain other trades. It was also responsible for 2% of voyages with agricultural produce, mainly in the form of peas and oats carried on ten out of its 25 upstream voyages. The region had a very minor role in the metals and sea produce trades, but some bar iron was shipped from forges around Carmarthen and oysters were sent occasionally from Milford. With the sole exception of agricultural produce, 2% of the voyages with which were to South West Wales, none of the downstream trades achieved more than a one percent share of the total number of voyages with any commodity type. Salt or other minerals were carried on just under half of the voyages to the region from Gloucester and crafts were carried on about one quarter. Otherwise, the region did not figure appreciably as a consumer of any other goods from the Severn valley, and no other goods features significantly in its imports from Gloucester.

The line in Table 4.10 for cross-regional voyages refers to vessels which were stated to be visiting more than one group of ports. These routes were typically to ports such as Bridgwater, Minehead and Cardiff and amounted to an average of under ten per year. Very mixed cargoes were usually carried, as is indicated by the tables, and it seems that a few merchants, such as the Claroes of Upton, operated on the basis of setting off with a varied cargo, hoping to sell wherever they could. The most typical cargoes at this time included malt, tobacco pipes, chairs, barley, linen and white salt.

No voyages were made in the five years to ports outside the Bristol Channel region. In other years, however, a few were made to or from Liverpool, London, and occasionally other ports such as Whitehaven. Vessels from Liverpool usually brought rock salt to Gloucester or Newnham after the start of the eighteenth century, and those from London carried back and fore very mixed cargoes, generally dominated by crafts and manufactures. In general, however, the pattern of voyages to and from Gloucester was confined almost exclusively within the Bristol Channel, and was dominated by the Port of Bristol itself.

iv. The trades of the river ports

A geographical examination of the classes of goods carried in the 1704-8 sample can also provide important insights into the nature of trade to and from the riverine ports. Tables 4.12 and 4.13 are devised in a similar way to those for ports below Gloucester. It should be remembered that these present data regarding the stated home port of the

vessels and therefore only assumed and not actual information about their places of collecting and depositing cargoes. Nevertheless, it is clear from internal and other evidence that most cargoes were collected or deposited at the home ports of the vessels[35], and this information has important uses in helping to define the nature of trade at the different Severn-side ports.

The uppermost urban port of the river, Shrewsbury, maintained a broadly-based downstream trade, but it was not of outstanding importance in terms of total trade for any one commodity group. It did, however, have an appreciable share in most trades. Shrewsbury held between 11 and 16% of the downstream voyages with textiles, agricultural produce, food and drink, and crafts, all of which were carried on between 85 and 95% of downstream voyages by Shrewsbury boats. The most important commodities from these classes were woollens, linen, Manchester ware and yarn brought overland to Shrewsbury from a wide region covering Wales and the north-west, cheese and wheat, malt, leather, and earthenware from north Staffordshire. Although many vessels from Shrewsbury carried these commodities, the volume of the cargoes was much smaller than from many other river ports such as Worcester or Bewdley, and the numbers of voyages counted here probably lend Shrewsbury a slightly larger importance than it deserved in these trades. All the other classes of trade except sea products were carried by about one third of all voyages downstream by Shrewsbury boats, and these comprised 4-7% of total trade in those commodities in terms of numbers of voyages. The principal commodities in these remaining classes were iron and lead, iron hammers, rock salt from Cheshire and also white salt probably from Cheshire, and timber. Some of these shipments may have been collected further downstream, from places such as the Severn Gorge which was not well served with regular boats as far as Bristol, and even from Bridgnorth or Bewdley which were.

Upstream trade by Shrewsbury boats also included all categories of trade to an appreciable degree. However the proportions of upstream trade which Shrewsbury seems to have consumed were somewhat larger than downstream, indicating perhaps that the town was of importance regionally as a consumer more than as a producer. It was the leading marketing centre for mid Wales as well as for central and northern Shropshire. It was most important as the carrier for nearly one fifth of all upstream voyages with textiles, although these were carried on only 17% of the Shrewsbury boats making loaded return journeys from Bristol. These upstream textiles seem to have comprised woollens and serge, haberdashery ware and even linen, indicating that Shrewsbury was an appreciable market for qualities of textiles different from those being produced more locally. Shrewsbury was also one of the four most important ports on the river, it seems, for the consumption of sea products, taking 17% of all

Table 4.12

Numbers and percentages of recorded downstream voyages carrying each class of commodity by home port

Number of voyages out of Gloucester with each class of commodity
by home port
1704 8 inclusive

Home port	Number of voyages including each class of goods: Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total
SLP+	57	43	125	139	61	140	133	0	147
Gorge	15	21	14	7	13	15	14	0	37
Bridgnorth	21	50	57	11	17	45	37	1	73
Bewdley	405	349	421	302	319	251	256	2	463
Worcester	132	379	286	283	299	389	388	2	425
Avon	1	1	16	11	7	33	24	0	37
Upton	1	35	33	1	12	24	29	0	35
Tewkesbur	19	64	92	45	50	165	187	1	222
GLC+	52	41	89	62	82	123	128	3	129
Estuary	50	1	19	2	12	71	4	0	103
Wye	29	22	19	3	2	22	19	0	45
Bristol	0	0	0	0	1	1	1	0	1
S Wales	0	45	10	0	0	9	0	0	45
S W.Wales	0	0	0	0	0	0	0	0	0
Somerset	0	3	0	0	0	0	2	0	3
Dev&Corn	0	7	1	0	0	4	2	0	7
Other	0	0	0	0	0	0	0	0	0
Unknown	8	3	4	2	12	11	11	0	14
TOTAL	790	1064	1186	868	887	1303	1235	9	1786

Number of voyages out of Gloucester with each class of commodities
expressed as a percentage of the voyages from each home port
1704 8 inclusive

Home port	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total voyages
SLP+	39	29	85	95	41	95	90	0	147
Gorge	41	57	38	19	35	41	38	0	37
Bridgnorth	29	68	78	15	23	62	51	1	73
Bewdley	87	75	91	65	69	54	55	0	463
Worcester	31	89	67	67	70	92	91	0	425
Avon	3	3	43	30	19	89	65	0	37
Upton	3	100	94	3	34	69	83	0	35
Tewkesbur	9	29	41	20	23	74	84	0	222
GLC+	40	32	69	48	64	95	99	2	129
Estuary	49	1	18	2	12	69	4	0	103
Wye	64	49	42	7	4	49	42	0	45
Bristol	0	0	0	0	100	100	100	0	1
S Wales	0	100	22	0	0	20	0	0	45
S W Wales	0	0	0	0	0	0	0	0	0
Somerset	0	100	0	0	0	0	67	0	3
Dev&Corn	0	100	14	0	0	57	29	0	7
Other	0	0	0	0	0	0	0	0	0
Unknown	57	21	29	14	86	79	79	0	14
									1786

Number of voyages out of Gloucester with each class of commodities
by home port, expressed as a percentage of all voyages with each class
1704-8 inclusive

Home port	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
SLP+	7	4	11	16	7	11	11	0
Gorge	2	2	1	1	1	1	1	0
Bridgnorth	3	5	5	1	2	3	3	11
Bewdley	51	33	35	35	36	19	21	22
Worcester	17	36	24	33	34	30	31	22
Avon	0	0	1	1	1	3	2	0
Upton	0	3	3	0	1	2	2	0
Tewkesbur	2	6	8	5	6	13	15	11
GLC+	7	4	8	7	9	9	10	33
Estuary	6	0	2	0	1	5	0	0
Wye	4	2	2	0	0	2	2	0
Bristol	0	0	0	0	0	0	0	0
S Wales	0	4	1	0	0	1	0	0
S W Wales	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0
Dev&Corn	0	1	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0
Unknown	1	0	0	0	1	1	1	0
Total voya	790	1064	1186	868	887	1303	1235	9	1786

Table 4.13

Numbers and percentages of recorded upstream voyages carrying each class of commodity by home port

Number of voyages into Gloucester with each class of commodity
by home port
1704-8 inclusive

Home port	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total
SLP+	61	11	87	80	14	95	110	58	112
Gorge	8	38	5	4	6	4	6	0	47
Bridgnorth	29	22	27	13	6	29	29	20	61
Bewdley	216	55	151	80	47	137	176	102	289
Worcester	151	65	197	164	57	176	264	59	284
Avon	12	37	25	21	14	15	33	22	48
Upton	3	4	0	0	0	6	1	0	10
Tewkesbur	42	115	64	35	20	53	95	29	161
GLC+	119	22	100	30	52	62	124	46	130
Estuary	0	0	0	0	0	1	0	0	1
Wye	120	37	56	0	74	63	5	1	122
Bristol	0	4	9	0	0	1	1	0	9
S.Wales	2	0	0	0	0	3	1	0	3
S.W.Wales	0	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0	0
Dev&Corn	0	1	1	0	0	1	0	0	1
Other	0	0	0	0	0	0	0	0	0
Unknown	6	1	3	1	0	2	8	1	9
TOTAL	769	412	725	428	290	648	853	338	1287

Number of voyages into Gloucester with each class of commodity
expressed as a percentage of the inward voyages by boats of each home port
1704-8 inclusive

Home port	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea	Total voyages
SLP+	54	10	78	71	13	85	98	52	112
Gorge	17	81	11	9	13	9	13	0	47
Bridgnorth	48	36	44	21	10	48	48	33	61
Bewdley	75	19	52	28	16	47	61	35	289
Worcester	53	23	69	58	20	62	93	21	284
Avon	25	77	52	44	29	31	69	46	48
Upton	30	40	0	0	0	60	10	0	10
Tewkesbur	26	71	40	22	12	33	59	18	161
GLC+	92	17	77	23	40	48	95	35	130
Estuary	0	0	0	0	0	100	0	0	1
Wye	98	30	46	0	61	52	4	1	122
Bristol	0	44	100	0	0	11	11	0	9
S.Wales	67	0	0	0	0	100	33	0	3
S.W.Wales	0	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0	0
Dev&Corn	0	100	100	0	0	100	0	0	1
Other	0	0	0	0	0	0	0	0	0
Unknown	67	11	33	11	0	22	89	11	9
									1287

Number of voyages into Gloucester with each class of commodity
by home port, expressed as a percentage of all voyages with each class
1704-8 inclusive

Home port	Metals	Extract	Crafts	Textiles	Wood	Agric	Food	Sea
SLP+	8	3	12	19	5	15	13	17
Gorge	1	9	1	1	2	1	1	0
Bridgnorth	4	5	4	3	2	4	3	6
Bewdley	28	13	21	19	16	21	21	30
Worcester	20	16	27	38	20	27	31	17
Avon	2	9	3	5	5	2	4	7
Upton	0	1	0	0	0	1	0	0
Tewkesbur	5	28	9	8	7	8	11	9
GLC+	15	5	14	7	18	10	15	14
Estuary	0	0	0	0	0	0	0	0
Wye	16	9	8	0	26	10	1	0
Bristol	0	1	1	0	0	0	0	0
S.Wales	0	0	0	0	0	0	0	0
S.W.Wales	0	0	0	0	0	0	0	0
Somerset	0	0	0	0	0	0	0	0

upstream voyages with these commodities, carried on more than half of all its return journeys. Agricultural produce, food and crafts seem to have been even more important as far as the returning Shrewsbury boats were concerned, being carried on well over three quarters of all their voyages. In each case, these made up the reasonably high proportion of 12-15% of all voyages upstream with those commodities. Tobacco, grocery and wine were the most important of the upstream commodities in the food and drink category and were carried on nearly all voyages. The principal crafts and manufactures were commodities such as oil and soap, and the main agricultural produce imported seems to have included hops, citrus fruits and a few raw materials such as teazles, hides and cotton wool. Shrewsbury therefore appears as a centre of conspicuous consumption with a strong demand for the luxuries of urban life and for a few commodities traded overland with the north west and Wales. Not surprisingly, the Shrewsbury boats were least significant in the industrial trades, representing only 8% of voyages with metals (on just over half of its upstream voyages and mainly consisting of lead) and only 3% of minerals (on only one tenth of voyages).

The trade of the ports of the Severn Gorge region was in some respects the very opposite of Shrewsbury's, in that it was of small importance for all categories, and its most significant trades were metals and minerals, principally iron, ironwares and coal. Even in these categories of downstream trade, the Gorge ports provided only 2% of voyages. Minerals were carried on 57% of downstream voyages from the Gorge and metals on 41%. This makes it clear that as far as long-distance trade, to Bristol, was concerned, the iron and coal trades of the Gorge were not of the outstanding importance often ascribed to them. At this date Bewdley was still dominating the iron trade to and from Shropshire and the enormous growth in the Coalbrcokdale locality had yet to take place. The picture of the iron trade was rather different even ten years later as Darby's Coalbrookdale enterprises took off. The low figures for minerals show that the vast majority of the coal leaving Shropshire by river, as much as 100,000 tons a year by the 1660s, was not reaching as far as the destinations below Gloucester, but was mainly being consumed in the regions above (Table 4.6). It is surprising how involved the Gorge ports were in other downstream trades given the difficulty of physical access to them by land which denied them important roles as ports serving large areas. The fact that Gorge boats comprise 1% of voyages in all other goods except sea products suggests that they were either collecting a few goods from their immediate hinterlands or were carrying goods transshipped in the Gorge or collected further downstream. Most of these goods appeared on one third of voyages, and even textiles appeared on 19%. The large quantities of pitch and timberstuff carried were probably locally produced, but cheese, salt and linen were almost certainly produced elsewhere.

The upstream trade by Gorge boats was also surprisingly diverse, even if not large by the standards of major urban ports. The Gorge had an important share of 9% of the upstream trade in minerals. Surprisingly, most of this was coal, but it is uncertain whether it was being carried back to Shropshire. One explanation might be that vessels which carried coal downstream, marketing it to the Severnside towns, found it worth their while to carry on to Bristol and collect a return cargo of coal from there to distribute to their familiar markets on the upstream journey. Minerals, usually coal, were carried on a staggering 81% of all upstream journeys by Gorge boats. This familiarity with the market may be the most satisfactory explanation for the upstream trade in coal, but it accounted for more upstream voyages than down with minerals, and slightly more than all the downstream voyages from the Gorge put together. Other partial explanations may be that different types of coal such as smith coal from Bristol or anthracite from South West Wales were in demand in the Shropshire coalfield and below, and the Gorge boats were well placed to supply it. By contrast, the trade in metals by Gorge boats was slight, representing only 1% of voyages upstream with metals and being carried on only 13% of upstream Gorge boat voyages. This, again, suggests that the real importance of the Shropshire iron trade was still awaited and Bewdley was the principal broking centre for its supplies. An equal proportion of Gorge boats carried 2% of all the upstream shipments of wood, mainly in the form of deal boards. Apart from this the Gorge ports carried all other classes of goods on between 9 and 13% of their voyages and made up only 1% of the total. Sea products did not feature significantly at all, which is surprising given the large population of the area and its relatively high disposable income from industrial employment[36]. The presence of the others suggests that the Gorge did have some capacity as a consuming market for goods imported to the region, but this paled by comparison with any of the properly urban centres of the river.

Bridgnorth was involved in many of the same trades as the Gorge, being located so close to it, but it also had a much wider range of trades as an inland port with a wide hinterland. It achieved a small share of all the downstream trades, but no particularly large shares of any. Its most substantial contributions to the downstream trade were in having 5% of the voyages with crafts and manufactures and with minerals. These were the two most important trades as far as Bridgnorth was concerned, the former being carried on 78% of voyages and the latter on 68%. The minerals involved were pipe clay carried from the Gorge and salt, probably collected from the Droitwich field, and occasionally coal from the Coalbrookdale coalfield. The Jacksons family, who were the most heavily involved in the salt trade, migrated to Worcester, Droitwich's port, by 1710 where they carried on a large downriver trade in the mineral. The crafts and

manufactures were very varied, including earthenware from north Staffordshire, leather and paper. The port contributed 3% of downstream voyages with agricultural produce (on two thirds of its voyages), food (on half its voyages) and metals (on 29%). The most important individual commodities among these were cheese and bacon, honey, and iron, but none of these were carried in very large quantities. A quarter of all voyages from Bridgnorth carried wood such as hoops and timberstuff, making up 2% of the downstream voyages, but again with small cargoes; and 1% of all textiles were carried by 15% of the Bridgnorth downstream voyages.

The port received a wide spread of all commodities brought back upstream, usually in very diverse individual cargoes. The most important of these as far as the river trade as a whole was concerned were herrings and fish, which constituted 6% of voyages with sea products. Like the Gorge ports, Bridgnorth brought back coal or other minerals on one third of its voyages and this made up 5% of the upstream voyages with minerals. Bridgnorth took the respectable share of 4% of all voyages with crafts and manufactures, principally glass bottles and oil, metals such as iron and lead, and agricultural produce such as wheat and cider: each on just under half of all voyages. The port also receive 2-3% of the voyages with food and drink, mainly in the form of tobacco, grocery and wines, textiles, and wood. This sort of general spread of goods is to be expected from a moderate sized urban centre with a large hinterland which included the town of Wolverhampton.

The hinterland of Bewdley made it a port of infinitely more significance than Bridgnorth. It was known as the port for the southern part of the Black Country and Birmingham, and carried many goods to and from places like Stourbridge and Dudley, but it also served large parts of south Shropshire and Staffordshire and coordinated a large part of iron trading throughout the Severn. Bewdley boats were responsible for over half of all downstream voyages with metals, carried on 87% of their journeys. The vast majority of this metals trade consisted or iron and ironwares. Bewdley also retained about one third of all voyages with minerals, crafts, textiles and wood. Minerals such as pot clay from Stourbridge and salt from Droitwich were carried on three quarters of all Bewdley's downstream voyages. Crafts and manufactures such as lanterns, chairs, glass and glasswares from Stourbridge, earthenware, paper and leather were carried on 91% of all Bewdley voyages, being collected from its populous districts, which had both leading industries and urban and domestic crafts. The predominance of Bewdley in the shipment of chairs is shown in Table 4.15. It is likely that even those chairs recorded here as coming from Upton and Tewkesbury originated at Bewdley with its timber crafts based on Wyre Forest[37]. Textiles and wood were carried on two thirds of Bewdley's voyages out of Gloucester, including Kidderminster

stuff produced only a few miles away, wickyarn, and timber and timberstuff from the neighbouring Wyre forest. Its smallest shares of downstream trade were in agricultural produce and food; but even in these cases it mustered about 20% of all downstream voyages and the goods were carried on a minority of vessels. Such large and complex cargoes show the extraordinary diversity of the local economy around Bewdley and the importance of early industrial growth in the area within several sectors. In most of these sectors, the dominance of the port was even greater than the figures suggest, since Bewdley boats often carried the largest shipments of many commodities.

Bewdley was, above all, an exporter, and its upstream cargoes were somewhat less dominant on the river, even though still significant. Bewdley boats coming upstream represented roughly 21-30% of the trades in sea products, metals, crafts, agricultural produce, and food. Metals were outstandingly important, appearing on three quarters of all Bewdley's upstream voyages and dominated by bar and pig iron, principally from the Forest of Dean, but also from wider regions through the Bristol market. Crafts and food also appeared on more than half of all Bewdley's voyages; and sea products (especially kelp for the Stourbridge glass works) and agricultural produce appeared on more than a third. The port had a rather small share, around 13-19% of voyages with textiles, wood and minerals which were made up of the typical upstream cargoes of the river; but these were still very substantial compared with other ports. Such diversified cargoes underline the relative prosperity of the region, enabling it to consume a variety of goods.

The busiest port on the river apart from Bewdley was Worcester. It contributed a very substantial, but never major, share to all the commodity sectors, in both up and downstream trade. Worcester boats carried out 36% of all voyages downstream with minerals, owing to the proximity of the city to the Droitwich salt field; nearly 90% of all their downstream voyages carried salt. Cargoes were slightly smaller in volume than those carried by some other ports, however, with the result that Worcester boats carried rather less than a third of the trade by volume[38]. In terms of the trade by numbers of voyages, Worcester also carried one third of all with textiles, wood, agricultural produce and food and drink. That agricultural produce and food and drink appeared on over 90% of all downstream voyages by Worcester boats demonstrates the enormous agricultural productivity of the Worcester region, fielden Worcestershire and Warwickshire. The commodities composing these trades were most notably cider, spirits, wheat, malt and hops. Textiles and wood, also carried on over two thirds of Worcester's downstream voyages, included woollens from the county (principally Worcester undyed broadcloth), and linen and Manchester ware which had presumably been transshipped from ports further upstream or brought by land. Voyages by

Table 4.15

Recorded downstream trade in chairs (in number of chairs)

by home port

Year	Bridgnorth	Bewdley	Worcester	Upton	Tewkesbury	Others	TOTAL
1637							0
1647							0
1656							0
1666		84	36			12	132
1674			10				10
1684				124	54	6	184
1697	12	660		212	282	24	1190
1699	60	1026	54	150	228		1518
1704	42	726	102	132	240		1242
1705	134	384	72	96	270	60	1016
1706	24	354	12	216	252	52	910
1707		1488	168	198	360	24	2238
1708		1026		240	192		1458
1715		445		216	180	24	865
1722		1680	120	432	420	420	3072
1733							633
1741							11
1752							
1765							

Worcester boats were one quarter of all those carrying crafts and manufactures downstream, including copper money, nails, and household goods. The city seems to have acted as the port for metal working villages and towns of north Worcestershire such as Bromsgrove and Belbroughton. The city had a less productive hinterland in this respect than Bewdley, it would seem, but such goods were nevertheless carried on two thirds of downstream voyages by its boats. It was much less important than Bewdley only in the metals trades, for which it was the port for only 17% of voyages. Metals were carried only on one third of voyages from the port. Even in this instance, however, Worcester seems to have had an important transshipping role for iron and ironwares. Abraham Darby's ironwares, certainly, were often transshipped there[39]. Worcester's economy was more specialised than Bewdley, but its own strength and its role as a transshipment port gave it a very considerable role in all branches of downstream trade.

The city, as the largest urban centre in the west midlands, with a population of about 10,000, was also an important consumer or shipper of upstream trade. Worcester boats made very roughly one third of all upstream voyages with textiles, food, agricultural produce and crafts. Of these, food and drink came on 93% of voyages, principally in the form of tobacco, wines and grocery. About two thirds of the boats brought textiles, agricultural produce or manufactures, in the forms of goods such as yarn, hemp seed, teazles, wool, hides and skins, bottles for cider, wool cards, pitch and oil. Many of these were destined to be used by local trades in the production of other goods such as cider and woollens. In addition, between 16 and 20% of all upstream voyages with wood, metals, sea produce and minerals were by Worcester boats. Metals appeared on over half of the voyages and consisted of lead and shot, wire, battery ware and some iron. The other goods all appeared on about a quarter of voyages and included herrings, raddle, callamy, and deals. Although these goods fall very widely across the classifications of commodities, it is clear that most of the upstream trade of the city was concerned either with foodstuffs and luxury goods or with producer goods for the woollen textile and cider trades.

The Avon ports (essentially Evesham) were of little significance compared with Worcester. They had specialist downstream trades, but appreciable quantities of upstream goods in every class. The only classes of downstream trade which registered as above 1% of all those downstream for each class were agricultural produce and food, which were carried on 89% and 65% of Avon boats going downstream and made up 3% and 2% of all voyages with those commodities respectively. The principal goods involved were wheat, bread and malt, but none of the market garden produce with which the Vale of Evesham was at this time moving towards as a speciality[40]. It seems

that at this time the region was still oriented toward grain crops. Some 43% of Avon boats carried crafts or manufactures, the most important of which were apparel, bricks and oil. About one third carried textiles, in the forms of stockings, thread and wickyarn, and about 19% took wood.

The upstream trade by Evesham boats was extremely broadly based and included a very large number of goods and commodities in demand in the Avon valley. It is notable that very mixed cargoes were usually carried by each boat, the number of voyages with each class of goods varying from 25% up to 77%. The valley was wealthy enough as a consumer to have between 2% and 9% of upstream voyages in all commodities, in strong distinction to the trade of the Gorge communities. The Avon's largest share was of the upstream coal trade, at 9% of voyages, presumably reflecting the slightly greater difficulty of getting Shropshire coal there than at places on the Severn itself, and also the value of anthracite from south west Wales for malting, which was an important activity in the area, as the downstream trade shows. Apart from this, the Avon ports received a typically wide range of goods for local consumption or processing, including tobacco, wines, grocery, raw hides, glass bottles for cider, oil, soap, linen and woollen cloth.

Upton was a small port but one with an unusual pattern of trade. It had no appreciable upstream trade, having only an average of two inward voyages a year through Gloucester. Its downstream trade was more extensive, though it did not make a great impact on the trade in any of the commodities types in question. It is most notable that those commodities that were carried downstream were usually carried on a very large proportion of the voyages. Thus, every single voyage carried salt, 94% carried craft products such as pipes or chairs, 83% carried malt, 69% carried wheat or other agricultural produce as it was the port for the cereal growing district of Herefordshire, and one third carried rods or other wood. It was these Upton boats above all that were involved in the cross-regional, apparently speculative, trade described at the end of section iii. Table 4.14 shows the home ports of vessels shipping tobacco pipes in selected sample years[41]. In most years, Upton was the leading tobacco pipe shipping port on the Severn, yet there is no record that it had any pipemakers in this period[42]. The places in the region which did produce pipes on a large scale were Bristol, Barnstaple and Broseley, and it is almost certain that the pipes coming downstream originated at Broseley and were transshipped at Upton from which vessels operated by the Claroe family sailed on tramping voyages to Somerset and ports is South Wales. The strength of the local producers in Bristol and Devon seem to have prevented direct shipments of pipes there from Broseley, and it was mainly the South Wales market beyond the Severn valley which was open to Broseley makers[43]. This is confirmed by

Table 4.14

Recorded downstream trade in clay tobacco pipes (in gross)

		---	Brockweir	Bridgnorth	Bewdley	Tewkesbur	Upton	Worcester	Others	TOTAL
1674	voyages	0	0	0	0	1	0	0	0	1
	% of port	0%	0%	0%	0%	2%	0%	0%	0%	
	Gross	0	0	0	0	18	0	0	0	18
	% of pipes	0%	0%	0%	0%	100%	0%	0%	0%	100%
1684	voyages	0	0	2	0	6	10	0	0	18
	% of port	0%	0%	18%	0%	13%	48%	0%	0%	
	Gross	0	0	61	0	518	530	0	0	1109
	% of pipes	0%	0%	6%	0%	47%	48%	0%	0%	100%
1697	voyages	0	0	0	2	5	6	0	2	15
	% of port	0%	0%	0%	2%	12%	33%	0%	1%	
	Gross	0	0	0	38	330	843	0	180	1391
	% of pipes	0%	0%	0%	3%	24%	61%	0%	13%	100%
1705	voyages	0	1	9	1	1	6	0	4	22
	% of port	0%	100%	39%	1%	2%	100%	0%	2%	
	Gross	0	100	770	200	300	2600	0	270	4240
	% of pipes	0%	2%	18%	5%	7%	61%	0%	6%	100%
1715	voyages	0	2	0	2	6	8	4	3	25
	% of port	0%	20%	0%	2%	10%	50%	5%	3%	
	Gross	0	78	0	190	610	2000	250	215	3343
	% of pipes	0%	2%	0%	6%	18%	60%	7%	6%	100%
1722	voyages	1	0	0	2	11	5	6	13	38
	% of port	2%	0%	0%	2%	19%	38%	9%	19%	
	Gross	50	0	0	90	1530	650	690	358	3368
	% of pipes	1%	0%	0%	3%	45%	19%	20%	11%	100%
1733	voyages	6	0	0	0	0	0	0	0	6
	% of port		0%	0%	0%	0%	0%	0%	0%	
	Gross	570	0	0	0	0	0	0	0	570
	% of pipes	100%	0%	0%	0%	0%	0%	0%	0%	100%
1741	voyages	4	0	0	0	0	0	0	0	4
	% of port		0%	0%	0%	0%	0%	0%	0%	
	Gross	420	0	0	0	0	0	0	0	420
	% of pipes	100%	0%	0%	0%	0%	0%	0%	0%	100%
1752	voyages	1	0	0	0	0	0	0	0	1
	% of port		0%	0%	0%	0%	0%	0%	0%	
	Gross	30	0	0	0	0	0	0	0	30
	% of pipes	100%	0%	0%	0%	0%	0%	0%	0%	100%

archaeological evidence of clay pipes of identifiable provenance found at sites in South Wales, up to 40% of which have been from Broseley[44]. As vessels from ports further up the Severn were unsuited to long coastal voyages, it seems that Upton, and to a certain extent Tewkesbury also, took on a special role of transshipping particular kinds of goods which had ready casual markets along the coast.

Tewkesbury was one of the most important of the river ports overall, but existed on a narrow base of commodities. It achieved 13% and 15% shares of the agricultural produce and food voyages downstream respectively, and these appeared on three quarters or more of all Tewkesbury boats in the forms of important local products such as malt, wheat, cider and perry. Malt was by far the most important of these, as Tewkesbury was a long-established and leading centre of malting. Tewkesbury boats made 8% of all voyages with crafts and manufactures, taking goods like chairs and tobacco pipes, as Upton boats did, to ports which most vessels did not trade to directly. This is visible in Table 4.14, and in table 4.15 which shows the home ports of downstream shipments of chairs. These goods seem to have been transshipped at Tewkesbury from producing regions further upstream to make use of this facility: in the case of chairs from Bewdley, and pipes from Broseley. For similar reasons, Tewkesbury boats took 5-6% of voyages with textiles, minerals and wood. The mineral was salt from Droitwich which was transshipped in the same way as pipes and chairs to reach more distant markets than Bristol; whilst some at least of the textiles and wood was produced locally in the form of stockings and rods. All these were carried on about a quarter of voyages by Tewkesbury boats. Again owing to its role in shipping further afield than Bristol, it managed even to achieve 2% of the voyages in the relatively closed downstream metal trades.

The upstream trade of Tewkesbury was much more widely-based than its downstream trade. The only commodity class within this trade which had a very substantial share of trade on the river as a whole was minerals: in this case 28% of all upstream shipments. This trade owed its prevalence principally to the demand for coal at Tewkesbury, and it appeared on nearly three quarters of upstream journeys by Tewkesbury boats. Its position low down the Severn meant that Bristol and Shropshire coals were similarly priced and therefore that coal from downstream had an opportunity to break the domination of Shropshire. Also, the town's role in malting created a demand for anthracite from South West Wales which could not be obtained except by trade via Gloucester but was specially prized in malting as burned slowly and with little smoke to contaminate the malt[45]. Tewkesbury boats also made around 10% of all the voyages with foodstuffs, sea products and crafts. Well over half of all Tewkesbury boats brought food upstream, generally in the form of grocery rather than wines or

tobacco, suggesting that it was not so prosperous an urban market as were Shrewsbury or Worcester. Certainly, it was not as large, with a population of under 3,000 compared with about 9,000 at Shrewsbury and 10,000 at Worcester[46]. Some 18% of voyages brought fish or herrings. Although 40% of boats brought back crafts or manufactures, these were of a small variety, mainly soap and oil, suggesting again that the Tewkesbury market was not a rich one. Tewkesbury upstream cargoes formed some 5 to 8% of all those with wood, agricultural produce, textiles and metals. These appeared on between one tenth and one third of voyages and were, again, of little importance in the river trade as a whole, consisting mainly of skins, wool, hemp seed and teazles, timber, some iron and various cloths.

Gloucester might be expected to have a lion's share of the trade of the river. It was the Custom port, where all vessels had to stop, and it was the port conventionally seen as at the mouth of the Severn. As far as its prominence in the documentary evidence is concerned, it should feature specially highly because it was at the very point where the records were being taken, unlike, say, Worcester or Bewdley, much of whose downstream trade may have stopped before it reached the Customs port. In fact, Gloucester had a poor share of the trade in almost all types of goods compared with other important urban centres on the river. In the downstream trade, Gloucester boats made only between 7 and 10% of voyages with all categories of goods except minerals, for which they achieved only 4%. This meant that for almost every commodity it ranked below Bewdley, Worcester and even Shrewsbury in numbers of voyages. Tewkesbury, too, was superior to Gloucester in some important commodities. Even allowing for the fact that Gloucester boats may have carried slightly larger cargoes, their share of the trade is unimpressive compared with the historical importance of the city. Gloucester was successful, however, in carrying a broad spread of trades, probably owing to its role as a transshipment point for river vessels unsuited to the estuary and merchants who did not wish to deal with the Customs House. Even metals and minerals were each carried on one third of voyages downstream by Gloucester boats; textiles were carried on almost half, crafts on over two thirds, and food and agricultural produce on almost all. This variety indicates that Gloucester boats might carry, if only in small volumes, the products of the whole Severn valley region. However they seem to have had a more important transshipping role for some goods than others. As the port furthest down the river, it was only able to transship goods which had not already been transshipped onto long-distance boats further upstream. Thus, unlike Tewkesbury, it had a relatively small share in the salt trade, and whereas Worcester carried much iron and Manchester wares which had clearly come from further upstream, Gloucester did not carry either of those commodities on a large scale.

An even greater gap in Gloucester's ability to attract transshipped goods concerned the products of the region around Bewdley, whose own boats were so prominent in the long-distance river trade that transshipment was not sought: goods such as pot clay and glassware were almost never carried on Gloucester boats. Unlike Tewkesbury and Upton, Gloucester's vessels did not sail to more distant locations than Bristol, and so did not receive transshipped goods for that particular reason. Nevertheless, the availability of a range of transshipped goods gave Gloucester a basis for having several classes of goods on most vessels. Those goods which were also produced locally on a large scale were carried on an exceptionally high proportion of Gloucester boats. The prominence of the district in the production of malt, spirits, hemp, hops and cider in particular resulted in agricultural produce being carried on 95% of voyages by Gloucester boats downstream and food and drink being carried on 99%. It is interesting, however, that the port's trade by river in textiles was on only less than half of boats and made up only 7% of downstream voyages with that class, given the importance locally of the woollen industry. In fact, woollens were very seldom carried by Gloucester boats, Manchester wares were all carried by boats from further upstream, and the only important textile cargo for the Gloucester boats was linen. This must reflect the dominance in the region's woollen trade of the London dealers, who would have received their goods directly from Gloucester overland.

The upstream trade of Gloucester boats appears to have been more significant in terms of their share of voyages with different classes of goods. This may have been because, whereas other ports further upstream were better placed to intercept goods heading down river and needing transshipment, Gloucester was no worse off than them, and in some ways slightly better placed, for goods returning. Wood appears to have been Gloucester's most successful class of upstream trade, and its boats were responsible for 18% of upstream shipments with that type of commodity. Even in this class, however, it was the third most important home port grouping in terms of numbers of voyages, after the Wye ports and Worcester. Wood was carried on just over half of Gloucester upstream voyages, in the forms most frequently of deal boards and corks, presumably for cider bottling. Gloucester was also responsible for 14-15% of voyages in each of sea products, food and drink, crafts and manufactures, and metals. Despite their greater percentage share of voyages than in the downstream trade, however, in all these classes Gloucester boats were still less prominent than those of Bewdley or Worcester, and in many they ranked below Shrewsbury or the Wye ports also. Sea products appeared on about one third of upstream voyages by Gloucester boats, in the forms of white fish and herrings. Crafts and manufactures were carried on 77% of voyages, most frequently in the forms of soap, oil and glass bottles, again presumably

for cider. The numbers of wool cards being brought upstream by Gloucester's boats were negligible compared with those for Worcester. Metals and food and drink were each carried on over 90%, principally in the forms of lead and shot, ironware, copper, brassware, grocery, wine and tobacco. Agricultural produce was shipped on about half of upstream voyages, making one tenth of all those on the river: amongst which the most prominent commodities were skins and hemp, whilst grains and cider were negligible, showing the strength of the Gloucester district in these commodities. Strangely, wool was barely ever carried upstream on Gloucester boats, though it was common on boats of Bewdley and Worcester: indicating that the textile industry in the district was less successful than Worcester's at this time, or else suggesting a dominance of local or London-mediated supplies of wool. Textiles were carried on only 23% of voyages and made up only 7% of those on the river as a whole, fewer than Shrewsbury, Bewdley, Worcester and even Tewkesbury: usually as consignments containing woollen, linen, mercery and haberdashery. Minerals were carried by 17% of voyages and contributed only 5% of all those on the river. The principal of these was callamy, probably transshipped for brass works further upstream. As in the case of Gloucester's downstream trade, it appears that the upstream trade was relatively broadly based in the sense that a high proportion of voyages took each class of cargo. However one does not see in the upstream trade of Gloucester the same wealth of different individual goods that can be seen on boats from towns like Worcester and Shrewsbury. Overall, it is clear from Gloucester's trade both up and downstream that it had neither the wealth and consumer-power, nor the trade and productivity of principal rivals in the Severn region, albeit that most of them, like Shrewsbury and Bewdley, were historically much less important and, theoretically, less well-placed for trade. Strong questions are also raised about its prominence, compared with Worcester, in the woollen trade, given the lack of cloth carried by its boats downstream and the rarity of wool cards and wool upstream.

The ports of the Severn estuary, Newnham and Berkeley, Lydney, Woolaston and others, were not specially prominent in the recorded trade of the Gloucester Port Books. They made an average of about 20 recorded downstream voyages a year in the period 1704-8, of which the great majority were from Newnham, on the Forest of Dean bank of the estuary. Only one upstream voyage was recorded by an estuarine boat in this period, carrying agricultural produce. As it is known that let passes were issued at Newnham on an extensive scale, the figures for this port cannot be regarded as entirely representative of all the trade that may have been going on[47]. The most prominent commodities on these voyages were agricultural produce, on over two thirds of outwards voyages, and metals on half. The agricultural produce shipped from the

estuarine ports was almost exclusively cider, exported in large quantities to both Bristol and London. Some cargoes contained nothing except cider. 5% of Gloucester's downstream shipments with agricultural produce were on estuary vessels. Iron must have been shipped in large quantities upstream from Newnham, but nothing is known of this from the Port Books. The metal trades downstream which were recorded consisted almost entirely of iron for Bristol. This was enough to give the estuarine ports a 6% share of all downstream metal shipments. Crafts and manufactures appeared on 18% of voyages and wood on 12%. These represented 2% and 1% respectively of all downstream shipments with these commodities. The former category consisted largely of tanned leather and glass bottles, made at the Newnham glasshouse[48]. The wood exported from the estuarine ports was mainly hoops from the Forest of Dean. The boats did take part significantly in any other class of trade.

Boats from most home ports outside the Port of Gloucester had a negligible role in the trade. Boats of Chepstow, Redbrook and Brockweir were much the most important, undertaking a regular trade in iron and non-ferrous metals. These voyages amounted to 4% of all those downstream with metals, and 2% of mineral, crafts, agriculture and food. The mineral trades were pot clay and salt, and the main downstream metal trade was hammers and anvils. A wide variety of the agricultural produce and foodstuffs of the Severn was carried by Wye vessels downstream. The clearer pattern was not in downstream cargoes, which were essentially return loadings, but upstream ones. The clear pattern here was that 98% of upstream voyages from the Wye ports carried metals, usually copper, wire or pig iron from the Redbrook copper works and the Forest iron furnaces and wireworks. This represented 16% of upstream metal shipments. Around half or more of upstream shipments by Wye boats were of agricultural produce, wood or crafts. Wood was most important, Wye vessels representing over a quarter of all upstream shipments carrying this category, consisting mainly of barrel staves and hoops from the Forest of Dean. Agricultural produce, crafts or minerals each contributed between 8 and 10% of upstream shipments in those commodities. These were cider, deer skins, oil, grindstones and millstones.

The only other home ports to feature appreciably were Cardiff and Swansea, both of which had vessels which made occasional voyages with iron, coal, peas or oats to Gloucester and made more frequent voyages outward with white salt, tobacco pipes, malt and chairs or other goods similar to those carried on the Upton boats which ventured to South Wales. The motive behind connections with Gloucester by boats from ports elsewhere in the Bristol Channel was almost exclusively to collect white salt for fisheries, and sometimes to exchange agricultural produce or minor crafts. Their voyages were negligible in number.

A few general conclusions should be drawn about the geographical patterns of commodity trades by boats of each home port. First, boats of almost every home port took part in a much more broadly-based upstream trade than downstream. This is to be expected given that for most ports trade by river was concerned to export the small range of locally produced goods and exchange them for a wide range that might have come from anywhere in the known world. The breadth of a port's involvement in downstream trade depended upon the size of its hinterland, the extent to which it took transshipped goods, and its industrial or craft base. The evidence from the Port Books reveals much about the economic character of individual places on the Severn in this way. Clear distinctions can be seen between the most successful ports on the river, Bewdley and Worcester, with their wide range of activities, and the less important centres like Gloucester, Tewkesbury and Shrewsbury which relied upon a narrower economic base in mainly agricultural activities together with transshipment where capacity was needed.

The breadth of upstream trade depended essential upon the prosperity of areas around each river port and the manufacturing activities in which those areas participated. The busiest ports, Bewdley and Worcester, had substantial needs for producer goods such as wool and iron, and had developed the wealth to import a wide range of foodstuffs and consumer goods. The wealth of urban centres on the river seems to be indicated by their ability to purchase such goods, especially sea products, crafts and textiles. The leading places in consumption of such commodities seem to have been Bewdley, Worcester and Shrewsbury, followed by the less prosperous towns of Gloucester, Tewkesbury and Bridgnorth.

This chapter has shown that analysis of the range and broad categories of goods can help considerably to develop understanding of river trade and the nature of economic development in the pre-industrial period. Individual commodity trades, such as those which have been discussed in tobacco pipes, chairs, coal, glass, grain crops and non-ferrous metals, permit more detailed understanding of the dynamics which lay behind the creation of patterns of trade. Much more wide-ranging exploration of some such commodity trades is needed to reveal more about the principles and practices underlying trade and to set each in its context of production and consumption. The following chapters undertake detailed explorations of the trade in two of the most important commodities carried on the Severn, salt and tobacco, each of which had quite different characteristics, to demonstrate the enlargement of understanding of internal trade that can be achieved with new methods of analysis.

CHAPTER 5.

THE TRADE IN SALT

The significance of salt in the pre-industrial economy can hardly be over-estimated. It was a crucial commodity. It was used in making and flavouring foods like cheese and bacon; the preservation of foods, especially fish and meat, relied upon it; it was employed in various crafts and manufactures, such as soap making and dyeing; it was the basis of many mercantile fortunes; and it was an important source of state revenue across Europe. The value of salt is suggested by those who took an interest in its production, from scientific writers like Plot to political economists like Houghton, explorers like Marco Polo and Hakluyt, and public administrators[1]. The necessity for trade in salt is illustrated by the ubiquity of roads and tracks identified with its distribution[2].

i. The salt trade and its analysis

The appreciation of the importance of the salt trade by contemporaries is in sharp contrast to the little serious attention the subject has had in general economic histories of the period[3]. The industry has been studied from a fiscal viewpoint in great detail[4], and competition between sources of salt has been examined to some extent. However, studies of regional competition have tended to rely upon general conceptions of the economic success of particular producing locations, rather than upon detailed information about the quantities of salt traded[5].

Salt was obtained from various regions of Europe in the seventeenth and eighteenth centuries. For the English market, the most important sources were the Mediterranean, Spain, Portugal and the Bay of Biscay, Tyneside, Cheshire, and Worcestershire. Lesser quantities of salt could be produced elsewhere, and there were, for instance, saltworks using local brine around Weston in Staffordshire and at Broseley and Kingley Wyche in Shropshire, and there were many coastal locations where sea-water was boiled[6].

Refined or 'white' salt was made by boiling water containing salt, whether sea-water, brine or a solution made from rock salt. At Droitwich, for instance, natural brine was collected in pits from springs and boreholes, and then lifted into pans for boiling.

The earlier pans were of lead, but iron ones were introduced at Droitwich in the seventeenth century. Fires were made under them with local supplies of timber and, later, coal brought from Shropshire and Warwickshire. The brine was boiled and scum raked off it with the aid of a little egg or blood. When the water had been driven off, the salt was raked into conical baskets for the moisture to drain away. Coarse grained salt, used mainly for preserving, was produced by slow boiling. Finer salt was made by rapid boiling and preferred for domestic use[7]. A strong salt known as 'clod salt' was the last residue at the bottoms of the pans and was favoured for making bacon and some cheeses[8]. Droitwich was particularly highly regarded for its fine salts, but it is unknown what proportion of its output consisted of them. Salt from France and the Iberian Peninsula was made mainly by evaporating sea water slowly in the sun, and so tended to be coarse grained[9]. It also tended to be more bitter and less penetrative as a preserver owing to its greater content of natural compounds other than common salt[10]. White salt from Cheshire was made in much the same way as that at Droitwich, but a great proportion of the salt it traded was unrefined rock salt. This was made into white salt before use by dissolving it in water and then boiling the water off. In many coastal locations, sea water was used in this process to make 'salt upon salt', which was regarded as good for preserving[11].

Salt was a staple traffic of the River Severn for much of the period studied. The river flowed within reach of two of the most important salt producing fields in the country and connected them with a wide region of salt consumption, including important urban markets and fishing ports. The two salt fields within reach of the river were that in Cheshire, around Northwich, Middlewich and Nantwich, and that in Worcestershire, around Droitwich. Both industries were of ancient origin. Cheshire's was prospering in the mid seventeenth century, but was limited by problems of transport both for finished salt and coal. This was improved from 1705 with the turnpiking of local roads and from 1732 with the opening of the Weaver navigation[12]. Cheshire produced both refined salt and rock salt after the only deposits in the country of the solid mineral were discovered there in 1670[13]. The Droitwich white salt was of a particularly fine quality, regarded as excellent for the preserving beef and herrings[14].

The trade in salt on the Severn serves as an example of one of the river's most important bulk trades over long distances, appearing on half the outward voyages through Gloucester by 1708. It was a trade for which marketing was less specialised and closed to newcomers than, for instance, iron or coal, which were largely restricted to producers; and it was of such magnitude on the Severn that there were opportunities for many individual carriers.

Salt and its varieties were described by several terms in the Port Books. Twenty four variant words and phrases were searched for in this study. The most important distinctions were those which occasionally suggested the origin of the salt, for example: 'Droitwich salt', 'English salt', 'French salt', 'Bay salt', 'Lisbon salt', and 'Spanish salt'; and those which specified the form or mineral quality: for example 'clod salt' (from the end of the refining)[15], 'white salt' (the common refined salt), 'rock salt', 'salt loaves' (used at table), and 'brine'[16].

Unfortunately, the most precise terms were used rarely, and the general terms 'salt' or 'white salt' were used for the vast majority of shipments. Much of the analysis below therefore must focus on the aggregate trade in salt rather than its components.

ii. The volume of trade

The total volume and direction of the trade in salt through the Port of Gloucester shows some strikingly clear patterns. In the first part of the period the traffic was slight and consisted largely of upstream trade. Many units of measure were used, but it is possible, with considerable time spent in converting them, to estimate their value in terms of the most common: the bushel[17]. There were a few voyages a year carrying salt upstream in most of the sample years until 1684 (Table 5.1), for example two voyages carrying just 100 bushels in 1637, 8 voyages with 1,520 bushels in 1647 and 11 with 1,527 in 1684 (Table 5.2). The upstream traffic last appears of any consequence in 1684, after which the downstream traffic begins. It seems that exports from and imports to the region of salt could not co-exist to any appreciable degree, suggesting that differences in the commodity itself were not important enough to create a stable two-way trade, unlike in the coal industry. The mutual exclusivity of inward and outward trade in salt is confirmed in the middle of the long period of import dominance, when in 1666 no salt was recorded coming up river, but some 9,472 bushels went down (Table 5.2). An unknown proportion of this may have been Cheshire salt: probably at least the 1,870 bushels carried on Salop boats. However the majority is likely to have been from Droitwich.

The explanation for two-way traffic on the Severn must therefore focus on factors of supply rather than of demand for different kinds of salt. The boom of downward traffic in 1666 may reflect one or all of several factors. One of these may have been a temporary and previously unsuspected opening of the Salwarpe navigation, work on which was begun in 1665 with the intention of permitting use by boats 'of six tons burthen at least'[18] but was soon abandoned. As five of the six locks were completed, it may be that even slightly improved transport to the Severn gave a

Table 5.1

Recorded upstream trade in salt

	Voyages	Bushels	Mean shipment
1637	2	100	50
1647	8	1520	190
1656	25	3911	156
1666	0	0	0
1674	2	640	320
1684	11	1527	139
1697	0	0	0
1699	4	116	29
1704	0	0	0
1705	0	0	0
1706	0	0	0
1707	0	0	0
1708	0	0	0
1715	2	1340	670
1722	3	1903	634
1733	0	0	0
1741/2	0	0	0
1752	0	0	0
1765	0	0	0

Table 5.2

Recorded downstream trade in salt

	Voyages	Bushels	Mean shipment
1637	0	0	0
1647	0	0	0
1656	N/A	N/A	N/A
1666	43	9472	220
1674	0	0	0
1684	1	6	6
1697	126	45200	359
1699	123	69519	565
1704	132	114207	865
1705	126	114207	906
1706	137	113112	826
1707	176	128286	729
1708	197	159953	812
1715	156	216434	1387
1722	155	186919	1206
1733	189	297588	1575
1741/2	153	242513	1585
1752	172	242022	1407
1765	47	74060	1576

temporary boost[19]. The cost of land carriage over the seven miles to Worcester from Droitwich was a significant proportion of the market price of salt. It cost 5s. per ton to Worcester at the end of the seventeenth century (as much as the cost all the way to Bristol by river) compared with a market price of 1s. 6d. at Droitwich[20]. According to one contemporary estimate, water carriage down to the Severn would have saved about seven eighths of the cost by road[21], so even a partial opening of the Salwarpe might have had a striking effect. Unfortunately there are no other surviving Port Books for the later 1660s to test this further. This circumstantial evidence is all that is known to indicate that the Salwarpe might have been used.

An alternative, and perhaps more likely, reason for the boom in downward shipments of 1666 may have been that the Second Anglo-Dutch war of 1664-7 was interfering with supplies normally received from Iberia and the Bay of Biscay[22]. The French were allied with the Dutch and so may have cut off some of the supplies from their own country. An account of the Droitwich industry in 1678 stated that during the Dutch wars (without specifying which of the three) Droitwich salt was carried to eastern counties of England which had previously used foreign salt[23]. There does not seem to have been effective disruption of trade with Iberia, and one would expect some salt at least still to be coming up river[24]. There is also some evidence to suggest that the war might have decreased trade rather than increased it: the press was threatening watermen on the river in 1666 and was taking many away[25]. The fact that tobacco shipments in this year were also quite different from the more normal pattern, with tobacco being shipped downstream rather than up, indicates strongly that trade was indeed badly disturbed[26].

Some time between 1684 and 1697 the downstream trade in salt became overwhelming. There was one voyage down with salt in 1684 (carrying about six bushels, from Worcester). About 3,367 bushels were carried in 1691, of which a substantial proportion was probably from Cheshire[27]. Trade may have been boosted temporarily by a shortage of salt in 1691, indicated by evidence given to the House of Lords that 'There is neither Newcastle nor Nantwich salt now in London... for want of this salt we cannot sell our hogs and so are forced to shut them up'[28]. This was probably closely connected with the effects of the war against France, which started in 1689. William Stout of Lancaster in 1689 wrote that the war was increasing salt imports from Spain and Portugal, but the Cheshire salt trade was also growing[29]. The increase in trade on the Severn was maintained, and by 1697 there were 126 voyages downstream carrying 45,200 bushels. The number of voyages was maintained until about 1706, after which it began to rise steeply again, but the quantity of salt rose much more, to 69,519 bushels in 1699 and 114,207 bushels in 1704. Mean shipment sizes

rose from 359 bushels in 1697 to 565 bushels within two years and 865 bushels by 1704 (Table 5.2). By 1708 50% of all outward voyages from Gloucester carried salt. This represents a period of extraordinary expansion in the salt trade of the Severn valley. In 1699 activity was so frenzied at Worcester that it was reported by one visitor that horses were regularly stolen to press into salt carriage: 'Mine was wanting one night but found in the street next morning, being believed to be taken upon the like service'[30]. By contrast, the upstream trade in salt in the seven years sampled between 1697 and 1708 consisted of only 116 bushels, divided between four voyages in 1699. Even in a year of peace with France and Spain, then, imports were small.

It seems that Cheshire salt, or at least rock salt, played a fairly small part in this boom of downstream trade. Rock salt, having been discovered only in 1670, would have been a highly distinctive item of trade, and it may be reasonable to assume it was usually described as such. Of the 45,200 bushels of salt carried in 1697 only 448 bushels were specifically described as rock salt. It is a valuable illustration of the difficulties of transport in Cheshire that it should have made the long overland journey to the Severn at all. From Nantwich, the nearest salt town of Cheshire, to Shrewsbury, was 31 miles[31], and Nantwich was already declining as the leading Cheshire salt town in the late seventeenth century, so overland salt may have come even further[32]. Probably at least another 2,571 bushels carried on Shrewsbury and Bridgnorth boats in 1697 were also Cheshire salt. In 1704 there were six voyages of Shrewsbury boats carrying just over 1,000 bushels, all of which was specified to be rock salt, and no other port was involved in the rock salt trade. It is unlikely that white salt was still being carried overland by this time, since it was now much more readily available from Droitwich[33]. By 1715 the downstream rock salt trade was virtually dead, at 74 bushels (on a Worcester boat), although some was coming upstream having been shipped coastally from Liverpool. Shrewsbury boats no longer carried any salt at all. Clearly, whilst market preferences for different types of salt did have some influences on trade patterns, they were of tiny importance compared with the conditions of supply.

There seem to be two principal explanations for the burst of activity in the 1690s. The first concerns the heavy new salt duties imposed from 1694 to 1698, which were double the value on imported salt than on English salt (salt for fishery only being exempted from payment) and would have encouraged trade from both Cheshire and Worcestershire. The duties were doubled again in 1698 to many times the prime cost of the salt and were made perpetual, thereby maintaining an even greater advantage for native salt[34]. The duty was charged at the works or at import and the fishing trade now paid the full price for its salt inclusive of the duty, though it could claim a new bounty on fish exported to counteract the increased cost. The evidence from the Port Books

suggests that an industry which had been relatively passive for many decades was greatly stimulated by this new protection.

The other main factor in the astounding growth of the 1690s was the activity of Robert Steynor, who sank several new brine pits outside the borough of Droitwich between 1692 and 1695 and broke the old proprietors' monopoly, which had kept prices high and output low. A similar movement was taking place at Northwich at around the same time[35]. The result was that the price of salt at Droitwich fell from 1s. 6d. to 6d. a bushel and it was sold at Bristol 'at ruinous prices'. Most of the decrease in price came after 1695, when a final Chancery case on the matter was resolved in Steynor's favour, causing many others to sink new pits. One source suggests the fall in salt prices at this time was even greater, from 2s. down to 5d. per bushel[36]. Figures available for the growth of production at Droitwich at this time match closely the increase in trade on the Severn (see below).

One final factor for the reduced price and increased trade may have been the introduction of iron pans fired by coal instead of lead pans fired by wood, which occurred at the same time that the monopoly was broken[37]. Both Nef and Hughes suggested that this development, which occurred at different salt producing centres at different times, was a vital aid to increased output[38]. However the chronology of their introduction at Droitwich is uncertain. Coal and iron pans were said to have been in use there by 1615, but this practice seems to have become officially adopted by the proprietors only in 1691, when 'they were found to answer very well'[39]. It seems clear that coal was in general use by the period of great expansion in the 1690s, and made possible the great expansion of the industry which was brought about by other causes but would have been strictly limited by shortages of timber as a fuel[40].

The only time in all the sample years studied that brine was recorded in the Port Books was in the expansive 1690s. In 1697 there were four voyages, all on Worcester boats going to Bristol, carrying a total of 19 hogsheads. In 1699, however there were six voyages on boats from Bewdley, Tewkesbury, Upton and Worcester, totalling 35 hogsheads, 172 barrels and 20 tons. The destination of only a small part was Bristol, the majority going to Ilfracombe, Cardiff and Minehead. Most of the shipments in both years were carried alongside white salt in the same cargo. This pattern strongly suggests that there was no special use for the brine, but that it was being used as a substitute for refined salt: much of it was carried to fishing ports and that to Bristol was largely carried on Worcester boats which rarely sailed to any other destination. It is possible to estimate the amount of salt that could have been made from the brine. This might have been about 17 bushels in 1697 (or 0.04% of salt shipped downstream), and about 217 bushels in 1699 (or 0.31% of salt shipped downstream)[41]. The figures are

therefore insignificant in terms of the volume of trade, but given the rapid growth in the period, they may reflect some of the difficulties of salt supply that were being experienced.

Given the sudden and short-lived growth of brine shipment and the fact that it paralleled a period of sudden growth in the salt trade, it may reflect a shortage of refining capacity and a need for consumers of salt, particularly in fishery where the product was vital, to get whatever they could, even if they had to refine it themselves. Refining works, principally for rock salt, had indeed been set up at Bideford, Bridgwater and elsewhere in the south-west before the end of the seventeenth century, and the use of brine to dissolve rock salt before re-boiling it would have been practicable[42].

This period of expansion also saw some trade in manufactured salt loaves. It is possible these were traded at other times, but hidden within other categories of goods, such as 'saltery'. However, few such categories were well-represented in downstream trade, and one would expect any large shipments of salt loaves to be sufficiently distinctive to be mentioned. They were indeed mentioned on ten occasions in all the sample years studied. Two loaves were carried on a Bewdley boat to Bridgwater in 1684. Two Worcester boats carried a total of 36 to Chepstow and Bristol in 1697. An Upton boat carried four to Cardiff in 1699, and a Worcester boat six to Bristol in 1705. The busiest of the sampled years was 1707, with a total of 22 loaves carried to Bristol and south Wales on two Worcester voyages and one voyage each of an Upton boat and a Coggan Pill boat. Finally, one bushel of salt loaves was carried to Carmarthen in 1741/2. It is almost certain from this pattern that the salt loaves were manufactured in Worcester or nearby: in all the sample years (excluding 1741/2)[43], Worcester boats carried 50 loaves out of a total of 70 recorded. The remaining 20 were all being carried to places to which Worcester boats did not sail: namely Bridgwater and south Wales. This supports the assertion by Houghton that Worcestershire white salt was of superior quality, since only the finest was used to make salt loaves[44]. It is clear, then, that some manufacturing of salt loaves did go on around the Worcestershire brine pits, but that it was not a regular trade throughout the period. It is possible that one main manufacturer was involved between about 1684 and 1707. The trade was infinitesimal compared with the trades in white salt or rock salt, and helps confirm that the vast majority of the salt shipped down the Severn would have been used for preserving or in industry, not at the table.

Shipments of salt in total downstream were higher still in 1707 and 1708 and jumped considerably in 1715 to reach 156 voyages carrying 216,433 bushels. By this time the mean shipment size of vessels carrying salt was 1,387 bushels. Much of this

expansion must be accounted for by growth generated in the changes of the 1690s. However it may have been added to by the increasing role in fishing of the ports of south-west England (Defoe said of the Devon fisheries in the 1720s, 'the demand for [herrings] has considerably increased, and consequently the trade')[45], and by the construction of the Droitwich to Worcester turnpike in 1713[46]. The old road was described in about 1700 as 'almost impassable for nine months of the year, by reason of the great and many loads of coal and carriage of salt which daily pass through it'[47]. Trade recorded in the Port Books slipped back somewhat to 186,919 bushels in 1722, but expanded to a peak in all the years sampled of 297,588 bushels in 1733. At this time 66% of all the outward voyages through Gloucester carried salt. They consisted 189 voyages with a mean shipment size of 1,575 bushels.

The revival of growth between 1722 and 1733 was almost certainly caused by the sinking of yet more new pits by Sir Richard Lane in 1725, which tapped new and stronger flows of brine beneath the previously exploited levels and is said to have greatly increased output[48]. Surprisingly, the years 1715 and 1722 also saw some upstream shipment of salt for the first time detected in the sample years since 1699. However, this consisted of a paltry 1,340 and 1,902 bushels respectively and only three voyages per year, all of which was rock salt brought coastally from Liverpool which may have gone no further upstream than Gloucester.

The revival in the down-river trade from Droitwich was followed by a long period of intense internal competition, many bankruptcies and decline in production. Between 1732 and 1796 the number of salt pans around Droitwich fell from 38 to 27[49]. Competition from the Cheshire salt producing region became more important, with the increasing use of rock salt in fishery[50], and the opening of the Weaver Navigation in 1732, which brought in coal for salt boiling more cheaply as well as reducing the cost of carrying the salt[51]. This factor has been recognised as one of the principal causes of the destruction of progress in the Tyneside salt industry[52]. Decline in the Droitwich salt trade seems to be reflected in the trade recorded in the Port Books, which fell to 277,070 bushels in 1735, according to Willan[53], and around 240,000 bushels in both 1741/2 and 1752. The numbers of voyages carrying salt remained high, but the mean shipment size fell slightly to 1,407 bushels in 1752, or 89% of its level in 1733. An effort was made in Droitwich to match the new transport facilities of Cheshire in 1767, with a scheme to build a barge canal from Droitwich to the Severn at Hawford. This was opened in 1771, but with no traffic records surviving for the waterway and the Gloucester Port Books terminated it is not possible to measure the extent to which this improved trade down the Severn[54].

The evidence for this latter decline as recorded in the Port Books must be

viewed with care for two reasons. The first is that it is clear the Port Books were recording less of the river traffic in general after 1725. This may not have had an overwhelming effect on the records of salt, since the salt figures remain much more consistent and higher than those for most commodities, perhaps because of the important role of the coastal Customs records in ensuring that the salt excise was not evaded[55]. Also, much of the trade was with more distant ports than Bristol and Chepstow and was therefore recorded more carefully. However, it is clear that by 1765 (when only 74,060 bushels were recorded) the operation of the system was extremely partial. The second reason for viewing the declining figures with caution is that smuggling to avoid the salt duty, even domestically, became rife at the beginning of the eighteenth century. The problem was serious enough that boatmen known as 'freebooters' were employed between Droitwich and Bristol to attempt to keep a watch on the salt trade[56]. It must also be emphasised, of course, that the Port Books only recorded trade in salt which passed through Gloucester and omitted much which would have been reserved to the river itself.

It is worth attempting to relate the figures compiled for trade in salt down the Severn to estimates of the output and consumption of salt in the period. The inward trade in salt was always extremely small compared with national quantities of salt made or consumed. One estimate of salt production in the 1630s suggests total English production was some 3,200,000 bushels, and consumption may have been twice as great through importation[57]. The amounts coming up the Severn in 1637 and 1647 were paltry by comparison at 100 bushels and then 1,520 bushels. These figures show that the Severn valley region was largely, if not entirely, self-sufficient in salt at this time, whether its supplies were from Worcestershire or Cheshire. This is confirmed by evidence relating to the damage to the Worcestershire salt trade caused in 1643 by the Civil War, which stated that it previously '...served Shrewsbury and Wales and many other places in the kingdom'[58], and by a reference in the Droitwich corporation records in 1680 to Droitwich salt being sold at Berkeley, below Gloucester, '...none having been sent before to so great a distance'[59].

The figures for downstream trade can first be related to production at Droitwich. In about 1674, before the period of expansion, production seems to have been about 120,000 bushels a year[60]. No salt at all was carried downstream through Gloucester in that year. Even in 1691, that carried amounted to only 3,367 bushels, of which a substantial proportion was probably from Cheshire[61]. Between nil and perhaps at most 1-2% of the salt production of Droitwich was therefore passing into the estuary. The market for Worcestershire salt was closely geographically limited, although it may have

extended to the limits of the Port of Gloucester.

It is an expression of the rapidity and importance of the change in the 1690s that trade through Gloucester within a few years was some two percent not of Droitwich production but of the national salt trade. Houghton estimated national salt consumption was in the year from March 1695 some 2,129,920 bushels, of which 2,033,140 bushels were produced in England and the rest imported[62]. The salt carried through Gloucester in 1697 was therefore perhaps 2.1% of national consumption and 2.2% of national production. Droitwich was contributing importantly to the rapidly increasing domestic production of the period and was trading its salt over a much wider area than previously.

By 1725 Droitwich production was about 600,000 bushels[63]. About one third of this quantity (excluding Cheshire salt on the river) was passing out of Gloucester in 1715 and 1722; and a half of it in 1733. Consumption of Droitwich salt inland therefore must have grown at the same time as trade down the Severn, and the geographical limits of the industry's markets were thoroughly transformed. However, they were kept in check by the opening of the River Weaver to the Cheshire salt field, which in 1732/3 carried twice the amount taken down the Severn from Droitwich[64]. Even with some decline in output and in trade after the 1730s, a similarly high proportion of production was traded through Gloucester. In 1771/2 output at Droitwich was 604,579 bushels[65], whilst the last reliable figure for salt shipments through Gloucester was some quarter million bushels in 1752. Even allowing for further decline in the intervening years, trade down the river must have constituted one third to one half of production. It was, however, small by now in comparison with the production of Cheshire: the salt sent down the River Weaver alone amounted in 1752/3 to about 1,120,000 bushels, or nearly five times that carried on the Severn[66].

iii. Geographical patterns of trade

Much of the development of the salt trade is reflected not only in its total scale, but also in the share held by the different river ports and destinations. This also sheds considerable light on the more general mechanisms of trade on the Severn.

In the first part of the period, when upstream shipments predominated, the destination was, of course, Gloucester. However the home ports of the vessels give an impression of how the consumption of salt was distributed. In 1656, for example, the exceptionally detailed record of shipments shows that 3,911 bushels were carried upstream, divided between 25 voyages, of which all but one were by boats of Tewkesbury or lower (Table 5.3, Table 5.4). It is extremely unlikely that any of this

Upstream voyages with salt

Year	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC+	Estuary	Wye	BRS	S.Wales	S.W.Wal	Somerse	Dev&Co	Other	Total	Year
1637								1	1									2	1637
1647								8										8	1647
1656				1			1	13	1	9								25	1656
1666																		0	1666
1674								2										2	1674
1684				1			1	6	2	1								11	1684
1697																		0	1697
1699	2			2														4	1699
1704																		0	1704
1705																		0	1705
1706																		0	1706
1707																		0	1707
1708																		0	1708
1715										1							1	2	1715
1722										1				1			1	3	1722
1733																		0	1733
1741/2																		0	1741/2
1752																		0	1752
1765																		0	1765

Bushels of salt carried upstream
by home port

	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others	Total	
1637								40		60								100	1637
1647								1520										1520	1647
1656				320			20	2770	160	641								3911	1656
1666																		0	1666
1674								640										640	1674
1684				160			320	640	127	280								1527	1684
1697																		0	1697
1699	8			108														116	1699
1704																		0	1704
1705																		0	1705
1706																		0	1706
1707																		0	1707
1708																		0	1708
1715										120							1220	1340	1715
1722										1				1162			740	1903	1722
1733																		0	1733
1741																		0	1741
1752																		0	1752
1765																		0	1765

Tables 5.3 and 5.4

Recorded upstream trade in salt, by home port in voyages and bushels

was transshipped for ports further upstream. All of it was from Bristol, from which there was a wide choice of vessels to carry it, and any transshipment would have unnecessarily endangered the salt from damp and contamination.

All of it was described simply as 'salt' giving no clues to its origin, although it seems likely mainly to have been French or Spanish. In 1684, too, of the 11 voyages with salt upstream, only one carried 'rock salt' and came direct from Liverpool; of the remainder one carried 'Spanish salt' and nine just 'salt' from Bristol. Only one voyage went beyond Tewkesbury. Worcestershire did not need to import salt, even though it did not yet export below Gloucester. It is unclear what was the ultimate destination of the rock salt brought upstream on five voyages in 1715 and 1722, as nearly all was brought into Gloucester by vessels of much further afield: notably Liverpool, Milford and Rostrevor. All of it must have started by coast from Liverpool, but one shipment was mediated through Bristol[67].

That so little salt reached far upstream suggests that the Worcestershire industry held sway over the market of the upper valley, at least as far as Bridgnorth, where the overland carriage of Cheshire salt may have begun to be effective. In 1586 one Worcester merchant had been recorded as carrying salt to Gloucester but probably no further[68], and the sale of Droitwich salt at Berkeley in 1680 was considered novel[69]. This kind of pattern: of trade within economic limits within the Severn valley, seems to match that apparent in the Shropshire coal trade of little going beyond Gloucester.

The patterns of home port and destination in downstream shipments were more complex. In 1666, 5,234 bushels of the 9,472 sent down river came from Bewdley and Worcester, the two ports nearest the mouth of the Salwarpe, which may, as postulated above, have been temporarily navigable (Table 5.5, Table 5.6). However the home ports shipping salt were numerous, as might be expected were the salt being delivered to the mouth of the Salwarpe, not as usual to Worcester. The salt on Shrewsbury boats was probably from Cheshire. In addition to the 1,870 bushels carried by these, a Broseley boat carried around 800 bushels, although Broseley was an inaccessible port in the Severn Gorge and the far side from Cheshire and no boat from there appears in any later sample year carrying rock salt specifically. This may suggest that the boat was opportunistically collecting Droitwich salt on its way. It is generally held that salt works using brine from Kingley Wyche and coalpits in Broseley were not established until the eighteenth century[70]. Nearly all of the salt shipped downstream in that year went to Bristol, with some reaching south Wales and Somerset, but much of that sent to Bristol may have been transshipped for other destinations.

With the growth of the Droitwich salt trade in the 1690s, following the great gap in downstream trade in the 1670s and '80s, a more regular pattern of involvement in the

Downstream voyages with salt
by home port

Year	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC+	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Com	Other	Total	Year
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1647
1656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1656
1666	10	1	0	14	12	0	2	3	1	0	0	0	0	0	0	0	0	43	1666
1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1674
1684	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1684
1697	16	0	3	19	52	0	12	15	9	0	0	0	0	0	0	0	0	126	1697
1699	7	1	6	11	74	0	10	9	4	0	1	0	0	0	0	0	0	123	1699
1704	6	2	9	26	58	0	7	18	1	0	0	0	2	0	0	2	1	132	1704
1705	1	2	12	30	52	0	6	14	2	0	0	0	5	0	1	1	0	126	1705
1706	7	0	8	31	62	0	5	7	1	0	5	0	8	0	1	1	1	137	1706
1707	6	0	3	25	102	0	8	8	1	0	6	0	16	0	0	1	0	176	1707
1708	14	0	1	35	102	0	9	11	0	0	9	0	14	0	1	1	0	197	1708
1715	5	0	0	26	85	0	8	8	10	0	7	0	5	2	0	0	0	156	1715
1722	0	0	0	16	68	0	6	13	10	1	15	0	7	2	2	0	15	155	1722
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	189	189	1733
1741	0	0	0	2	1	0	0	0	0	0	0	0	0	0	0	0	150	153	1741
1752	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	170	172	1752
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	47	47	1765

Bushels of salt carried downstream
by home port

	SLP	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Com	Others	Total	
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1647
1656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1656
1666	1870	800	0	3810	1472	0	520	900	100	0	0	0	0	0	0	0	0	9472	1666
1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1674
1684	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6	1684
1697	1635	0	982	14453	9021	0	6652	10222	2235	0	0	0	0	0	0	0	0	45200	1697
1699	823	1400	7240	10644	33309	0	7670	6980	1213	0	240	0	0	0	0	0	0	69519	1699
1704	1097	878	4851	33157	43275	0	8257	21309	6	0	0	0	2879	0	0	844	573	117126	1704
1705	374	1935	8753	33462	37017	0	8931	18531	204	0	0	0	3466	0	1414	120	0	114207	1705
1706	1110	0	6678	32445	43237	0	8508	11924	354	0	1304	0	5167	0	1409	120	857	113113	1706
1707	891	0	2349	27762	60084	0	8186	15332	411	0	2972	0	10121	0	0	176	0	128284	1707
1708	2234	0	520	36550	77443	0	11523	16374	0	0	5419	0	8010	0	1201	680	0	159954	1708
1715	3985	0	0	34502	130466	0	18681	13595	6319	0	4231	0	2618	2037	0	0	0	216434	1715
1722	0	0	0	17908	93579	0	9759	16769	4499	550	14936	0	5890	1285	2898	0	0	168073	1722
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	297588	297588	1733
1741	0	0	0	2400	1869	0	0	0	0	0	0	0	0	0	0	0	238244	242513	1741
1752	0	0	0	800	1120	0	0	0	0	0	0	0	0	0	0	0	240102	242022	1752
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	74060	74060	1765

Tables 5.5 and 5.6

Recorded downstream trade in salt, by home port in voyages and bushels

trade by the different home ports of the region began to emerge (Table 5.5, Table 5.6). By 1699, for example, when 123 voyages downstream carried salt, according to the Gloucester Port Books, Worcester had become decisively the most important port in the trade, with 60% of all the salt-carrying voyages and 48% of all the salt by volume. This was at a time when Worcester was the home port of only 25% of downstream voyages. 80% of all the voyages from Worcester included salt within their cargoes (Table 5.7), in contrast with only 15 years earlier when 2% of Worcester voyages had carried salt. Salt must have been largely responsible for the rise in the number of voyages from Worcester (from 59 in 1684 to 84 in 1699), and helped to confirm the city's status as a leading Severn port. By 1708 102 voyages a year from Worcester carried salt, with a mean shipment size of 759 bushels (Table 5.8): totalling 98% of all the downstream voyages from that port. As in all the years studied, however, the port dealt almost exclusively with Bristol: 96 of its 102 voyages went there in 1708; and this must have been a principal factor for allowing some other ports to enter the salt trade by going to more distant ports, as is discussed below. Nevertheless, Worcester boats still carried 48% of the salt on the river by volume.

By the last sample year for which the home ports of boats are given in the Port Books, 1722, Worcester boats carried an even larger quantity of salt than in 1708, at 93,579 bushels (though it had reached 130,466 in the extremely busy year of 1715). This was carried on only 68 voyages, but represented 99% of all voyages from Worcester. Mean shipment size had nearly doubled since 1708 to 1,376 bushels, and Worcester boats now took 56% of all the salt carried downstream through Gloucester. It is impossible to tell what share of the trade Worcester held after this date, but there is no reason to think that it should have changed dramatically. With the opening of the River Weaver which diverted all Cheshire salt away from the Severn, Worcestershire became the only significant source of salt shipped downstream, and Worcester continued to be accessible to large vessels, unlike ports further upstream.

At the same time that Worcester was establishing its lead in the trade, the role of boats from Shropshire ports was declining. Shrewsbury itself had figured highly in the shipments of 1666, as has been discussed above, probably carrying salt from Cheshire. By 1697 Shrewsbury was identifiably carrying 448 bushels of rock salt, which could only have come from Cheshire, and 1,187 bushels of other salt, which was probably from the same origin. There were seven voyages during the year from Shrewsbury, giving a mean shipment size of a mere 102 bushels. Trade on Shrewsbury boats then fluctuated wildly during the five years 1704-8, ranging from 374 bushels in 1705 to 2,234 bushels in 1708. All of this was specifically stated to be rock salt, and it seems that by this time the white salt trade overland to Shrewsbury had been killed off

Percentages of voyages including salt
by home port

	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others	Total	
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1647
1656	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1656
1666	71	33	0	17	32	0	14	5	17	0	0	0	0	0	0	0	0	190	1666
1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1674
1684	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	1684
1697	70	0	13	20	68	0	67	36	26	0	0	0	0	0	0	0	0	298	1697
1699	26	14	27	13	88	0	100	23	9	0	100	0	0	0	0	0	0	401	1699
1704	20	20	47	29	77	0	100	37	3	0	0	0	100	0	0	100	50	583	1704
1705	4	50	52	32	73	0	100	31	9	0	0	0	100	0	100	100	0	652	1705
1706	23	0	57	34	89	0	100	15	5	0	83	0	100	0	100	100	33	740	1706
1707	19	0	38	28	97	0	100	18	3	0	35	0	100	0	0	100	0	538	1707
1708	44	0	13	35	98	0	100	31	0	0	47	0	100	0	100	50	0	618	1708
1715	29	0	0	23	97	0	50	13	20	0	50	0	100	100	0	0	0	481	1715
1722	0	0	0	17	99	0	46	23	18	10	68	0	100	67	100	0	31	578	1722
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	66	66	1733
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	51	51	1741
1752	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	67	67	1752
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31	31	1765

Mean shipment sizes for salt carried downstream, in bushels
by home port

	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others	Total	
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1647
1656	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1656
1666	187	800	0	272	123	0	260	300	100	0	0	0	0	0	0	0	0	220	1666
1674	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1674
1684	0	0	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	6	1684
1697	102	0	327	761	173	0	554	681	248	0	0	0	0	0	0	0	0	359	1697
1699	118	1400	1207	968	450	0	767	776	303	0	240	0	0	0	0	0	0	565	1699
1704	183	439	539	1275	746	0	1180	1184	6	0	0	0	1440	0	0	422	573	887	1704
1705	374	968	729	1115	712	0	1489	1324	102	0	0	0	693	0	1414	120	0	906	1705
1706	159	0	835	1047	697	0	1702	1703	354	0	261	0	646	0	1409	120	857	826	1706
1707	149	0	783	1110	589	0	1023	1917	411	0	495	0	633	0	0	176	0	729	1707
1708	160	0	520	1044	759	0	1280	1489	0	0	602	0	572	0	1201	680	0	812	1708
1715	797	0	0	1327	1535	0	2335	1699	632	0	604	0	524	1019	0	0	0	1387	1715
1722	0	0	0	1119	1376	0	1627	1290	450	550	996	0	841	643	1449	0	0	1084	1722
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1575	1575	1733
1741	0	0	0	1200	1869	0	0	0	0	0	0	0	0	0	0	0	1588	1585	1741
1752	0	0	0	800	1120	0	0	0	0	0	0	0	0	0	0	0	1412	1407	1752
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1576	1576	1765

Tables 5.7 and 5.8

Percentage of recorded downstream voyages which carried salt, by home port

Mean recorded shipment sizes of salt, by home port (bushels)

completely by the success of Droitwich; even before the Weaver had been improved. By 1715 the Shrewsbury salt trade was dead altogether. This indicates clearly that Shrewsbury boats did not collect salt on their way downstream, as there would have been no reason why they should not continue to participate in the salt trade if that were the case[71]. The same was probably not true of other ports of the upper river, however. The Duchess of Montgomery carried nearly 4,000 bushels of salt on five voyages in 1715, which must have been collected in Worcestershire[72]. The Duchess was, in fact, operated out of Worcester at certain times. Bridgnorth and the Gorge ports both occasionally carried salt between 1697 and 1708, though not afterwards. Bridgnorth became a relatively large carrier at the beginning of these years, taking 7,240 bushels in 1699 on six voyages, representing 10% of the year's downstream salt trade by volume. 40 bushels of this was specifically described as rock salt, but it seems likely that most was Droitwich salt: certain of the Bridgnorth boats had an advantage in collecting this in that they had regular trading links with Bridgwater and Chepstow in particular, where salt was needed. However these connections stopped in the following years with the removal of the Jackson family to a base in Worcester, and after 1708 the sample years show Bridgnorth boats carrying no salt at all.

Bewdley had a greater involvement in the trade, as might be expected from its proximity to Droitwich. The salt trade has been completely ignored in the most important past research into Bewdley's river trade, and yet it was certainly of considerable significance[73]. By 1699 the port had already grasped 15% of the trade by volume. Although only 13% of voyages from Bewdley in that year carried salt (compared with 88% of Worcester's), the mean shipment size was more than double that of the chief salt shipping port, at 968 bushels, and was the highest of any port on the river. Bewdley may have had some advantage over Worcester in being traditionally equipped for the carriage of bulky raw material cargoes[74]. Clearly, a proportion of Bewdley vessels were becoming regular carriers of salt. As had been the position with Bridgnorth boats, these were mainly the vessels sailing further afield than Bristol, which, as has been stated, was the almost exclusive destination of Worcester vessels. Of the 11 Bewdley voyages carrying salt in that year, six were going to Bridgwater, one to Chepstow and one to Ilfracombe.

In the eighteenth century Bewdley continued to hold a position of importance: in 1708 it carried 36,550 bushels or 23% of all the salt shipped. 29 of the 35 voyages involved were to Bridgwater. By now over one third of downstream voyages from Bewdley carried salt. However, this advantage seems to have declined somewhat in relative terms shortly afterwards. By 1722 Bewdley was carrying only 17,908 bushels, or 11% of the salt trade by volume, and on only 16% of voyages from the port. It had

lost out principally through competition with the ports of the lower river and the Bristol Channel.

The most important ports of the lower river in the salt trade were Upton and Tewkesbury. Both came into the trade early, having 15% and 23% of the trade respectively by 1697. The reason for this prominence, again, must have been their leading role as river ports which could communicate directly with a wide range of markets for salt around the Bristol Channel. Of the 27 voyages with salt from the two ports in 1697, only one was to Bristol, the port with which Worcester dealt almost exclusively. Unlike other ports on the river which responded to the salt trade, Upton and Tewkesbury were important in already having a great deal of their mercantile attention focused on these more distant markets. Indeed, it is noticeable how easily the huge boom in the salt trade seems to have been accommodated by these two ports. Whilst the total number of voyages (all goods) from Worcester grew by 76% over the quarter century between 1684 and 1708, and those from Bewdley by 34%, those from Upton and Tewkesbury actually fell, by 57% and by 22% respectively, despite the fact that they carried so much salt. By 1708 Upton and Tewkesbury together carried 27,897 bushels and had by far the largest mean shipment sizes of any ports. This volume was huge by the standards of the 1690s and was 17% of the total trade in 1708. Whereas Upton and Tewkesbury had been ready to capture a good deal of the trade in salt from the beginning, Worcester and ports above the origin of the salt had been able to expand gradually in response to the growth of the industry and to hold most of the additional trade as it developed. The three lower river ports of Upton, Worcester and Gloucester in fact tended to compete with each other for a reasonably stable slice of the salt trade (Table 5.6). Through most of the period, the voyages of Gloucester boats took a negligible share, but in 1715 and 1722 this became more appreciable whilst Upton's share fell back. By 1722 the three ports together carried 18% of salt downstream.

One additional feature worth noting of the trade in salt from this part of the river was that, despite the considerable involvement of Tewkesbury boats in the salt trade, boats of the River Avon ports, which passed through Tewkesbury on their way to Gloucester, never carried salt in any of the sample years. This confirms the view that Tewkesbury and Upton boats had a role in the trade principally because of their ability to travel far afield. The Evesham boats traded exclusively with Bristol, and this destination was already supplied by boats from ports nearer to the salt production area, notably Worcester and Bewdley.

It is surprising that Gloucester and ports in the estuary below, notably Newnham and Lydney, did not take a share of the salt trade, given the importance of being able to carry far afield, for which such ports in the deeper waters of the estuary were specially

suited. Boats from Newnham regularly sailed long distances, for example to London and to Whitehaven, however not much to Bristol and the Bristol Channel ports which were the chief white salt markets. The estuarine ports in fact carried no salt downstream in any of the sample years, apart from one small shipment in 1722 on a boat from Portbury. The explanation would seem to lie in the idea that the vessels which could collect salt themselves from Worcester or its environs were best placed to engross the salt trade. Transshipment took place below Worcester where it was necessary to get the salt to more distant markets; but Upton and Tewkesbury had an opportunity to take most of this on before it reached Gloucester or Newnham.

Boats from ports in the wider Bristol Channel, which were the destination of the salt, did gradually manage to gain a portion of the trade. They had none in 1697, and a boat from the distant River Wye port of Hereford managed to get 240 bushels in 1699 probably only because it came from a place no-one else could reach. Over the five years from 1704 to 1708, however, things began to change as vessels from ports like Brockweir on the Wye, Coggan Pill near Cardiff, Swansea, Bridgwater and Bideford began to sail up-river. In 1708 they carried between them 15,310 bushels or 10% of all salt downstream. It is uncertain how far these boats went to get their cargoes. However the Brockweir boats had connections at Bridgnorth and with the metalware trades of the west midlands[75] and it is almost certain that they sailed upstream past Worcester, enabling them to collect salt on their return. There is no positive evidence to suggest how far up-river other vessels sailed, but the failure of Gloucester and Newnham to gain substantial parts of the salt trade might provide a clue that they did indeed sail upstream further than these, at least as far as Tewkesbury. However, the small mean shipment sizes of these vessels may be a clue that they did not go far enough up river to grasp big cargoes. The Brockweir boats in 1708 had a mean shipment size of 602 bushels, the south Wales boats 572 bushels, and the one Bideford boat took 176 bushels. They did not engross all the trade to their destinations, which were also supplied by boats from Tewkesbury and Upton. South and south-west Wales boats for example took only 68% of salt destined for there in 1708. The position for vessels of Somerset, Devon and Cornwall was much weaker: they took only 3% of salt destined there. This might be taken to suggest that some of the south Wales boats at least sailed well upstream. The share of the Bristol Channel ports fell somewhat in 1715 to 8,886 bushels, but by 1722 had risen again to 25,009 bushels or 15% of the trade.

Some indication has already been given in particular contexts of the most important destinations for salt carried downstream. Further analysis of this sheds a great deal of light on the trade patterns and organisation which the salt trade may have created or

supported, and gives important indications of the uses of Severn valley salt. These are shown in detail in tables 5.9 and 5.10. In 1666 the voyages downstream were almost exclusively focused on Bristol: 36 voyages going there, four to south Wales and two to Somerset. Bristol took 91% of the salt by volume. At this stage Bristol was the typical destination for downstream trade of all sorts, attracting 81%. A great deal of this salt may have been consumed or internally distributed in Bristol. Some was probably exported (to the Newfoundland fisheries and colonial markets) or transshipped onto other coastal vessels.

The pattern of salt carriage that emerged in the 1690s appears to have had remarkable effects on the whole trading pattern of the Severn. One of the most immediately striking things about the figures is how much more widely spread is the trade in salt than for other commodities. In most years after 1697 every region around the Bristol Channel received salt from Gloucester. Whereas for the downstream trade of the Severn as a whole, Bristol was the predominant destination by far, taking 84% in 1699, it played a much smaller role in the salt trade. In 1699 it was the destination for 69% of the salt carrying voyages and only 48% of the salt. Salt was carried on only 30% of all the voyages that went there (Table 5.11). The mean shipment size to Bristol was much smaller than to most destinations, at only 394 bushels (Table 5.12) compared with an overall mean of 565 bushels. The metropolis increased its imports of salt from Gloucester about in proportion with the huge growth of the trade overall. By 1708 Bristol took 83,759 bushels of 159,953 shipped down river, or 52%. Its mean shipment size at this time was still low, at 698 bushels.

Around 1722 the trade to Bristol fell in relative terms, to 85,658 bushels and 45%; but it then rose dramatically to take 58% of the salt in the peak recorded year of 1733. Between 1708 and 1733 there had been a massive leap in the mean shipment size of voyages to Bristol with salt and a decline in their number. The port continued to take a growing share of the trade up to the last reliable sample year of 1752, when Bristol took 149,558 bushels, or 62% of downstream salt. The relatively slight variation in the port's share of annual trade alongside its significant variations in actual amounts carried would suggest that it was exercising a significant role as an entrepot for the mineral, not just as a consumer with more static demand. Certainly, Bristol did re-export salt for the Newfoundland and other fisheries, in which it was a leading European entrepot in the seventeenth century[76]. It also sent out salt for colonial markets, and coastally. Willan records that in 1734/5 Bristol shipped 37,954 bushels[77] of 'British white salt', largely to Devon and Cornwall. It is likely that much of the 110,120 bushels of Droitwich salt, or over 18% of the town's total sale, which was said to have been exported in 1771/2 would have passed through Bristol[78]. The city also had industrial uses for salt:

Tables 5.9 and 5.10

Recorded downstream trade in salt, by destination (voyages and bushels)

Downstream voyages with salt
by destination

	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Cross-R	Other	Total
1637									0
1647									0
1656									0
1666	36		4		2			1	43
1674									0
1684	1								1
1697	81	1	5		27		12		126
1699	85	4	5	1	21	5		2	123
1704	62	10	4		31	7	16	2	132
1705	60	10	7	4	30	4	11		126
1706	78	8	9	4	29	3	6		137
1707	108	10	18	4	26	4	4	2	176
1708	120	16	14	2	37	7		1	197
1715	86	18	6	4	41	1			156
1722	64	31	11	13	35	1			155
1733	100	39	10	8	29	3			189
1741	82	20	13	9	27	2			153
1752	98	26	10	10	27			1	172
1765		3	5	9	29			1	47

Bushels of salt carried downstream
by destination

	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Cross-R	Other	Total
1637	0	0	0	0	0	0	0	0	0
1647	0	0	0	0	0	0	0	0	0
1656	0	0	0	0	0	0	0	0	0
1666	8644	0	420	0	360	0	0	48	9472
1674	0	0	0	0	0	0	0	0	0
1684	6	0	0	0	0	0	0	0	6
1697	13409	600	2020	0	23999	0	5172	0	45200
1699	33480	2004	3550	400	24398	5360	0	327	69519
1704	40444	5617	4430	0	31683	8488	21588	1957	114207
1705	41864	4769	6295	6213	39060	4721	11285	0	114207
1706	47601	4204	7805	4272	38154	2969	8107	0	113112
1707	63461	6001	12987	3999	30790	5172	5556	320	128286
1708	83759	8744	9967	1770	46077	8082	0	1554	159953
1715	131499	11627	3359	3523	64562	1864	0	0	216434
1722	85658	23761	12603	16002	48060	835	0	0	186919
1733	172905	50553	12071	13728	43321	5010	0	0	297588
1741	142575	20665	10130	14261	48586	6296	0	0	242513
1752	149558	23452	7157	16185	44350	0	0	1320	242022
1765	0	2000	6600	13860	51040	0	0	560	74060

Tables 5.11 and 5.12

Percentage of recorded downstream voyages which carried salt, by destination
Mean recorded shipment sizes of salt, by destination (bushels)

Percentages of downstream voyages to each destination carrying salt

	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Cross-R	Other	
1637	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	1647
1656	0	0	0	0	0	0	0	0	1656
1666	17	0	17	0	13	0	0	50	1666
1674	0	0	0	0	0	0	0	0	1674
1684	0	0	0	0	0	0	0	0	1684
1697	31	7	56	0	56	0	57	0	1697
1699	30	40	100	50	78	100	0	67	1699
1704	25	56	57	0	94	100	100	67	1704
1705	25	56	41	50	97	80	92	0	1705
1706	33	57	60	36	83	100	100	0	1706
1707	38	63	72	67	90	100	80	15	1707
1708	42	73	64	25	100	70	0	8	1708
1715	29	53	100	80	91	100	0	0	1715
1722	21	72	79	93	100	100	0	0	1722
1733	55	98	83	100	78	100	0	0	1733
1741	39	83	68	90	93	100	0	0	1741
1752	56	100	67	100	100	0	0	50	1752
1765	0	100	25	100	94	0	0	10	1765

Mean shipment sizes for salt carried downstream, in bushels
by destination

	Bristol	Chepstow	S.Wales	SW.Wales	Somerset	Dev&Corn	Cross-R	Other	
1637	0	0	0	0	0	0	0	0	1637
1647	0	0	0	0	0	0	0	0	1647
1656	0	0	0	0	0	0	0	0	1656
1666	240	0	105	0	180	0	0	48	1666
1674	0	0	0	0	0	0	0	0	1674
1684	6	0	0	0	0	0	0	0	1684
1697	166	600	404	0	889	0	431	0	1697
1699	394	501	710	400	1162	1072	0	164	1699
1704	652	562	1108	0	1022	1213	1349	979	1704
1705	698	477	899	1553	1302	1180	1026	0	1705
1706	610	526	867	1068	1316	990	1351	0	1706
1707	588	600	722	1000	1184	1293	1389	160	1707
1708	698	547	712	885	1245	1155	0	1554	1708
1715	1529	646	560	881	1575	1864	0	0	1715
1722	1338	766	1146	1231	1373	835	0	0	1722
1733	1729	1296	1207	1716	1494	1670	0	0	1733
1741	1739	1033	779	1585	1799	3148	0	0	1741
1752	1526	902	716	1619	1643	0	0	1320	1752
1765	0	667	1320	1540	1760	0	0	560	1765

soapmaking was a substantial and well established industry in Bristol by the Civil War[79], and occasional unpalatably mixed cargoes from Gloucester to Bristol, like 'salt and oil' or 'salt and tallow' suggest some of the salt sent downstream at least was for that purpose.

Bristol also received salt from overseas[80] and from Liverpool. Bristol had received 18,100 bushels from Liverpool in 1690[81]; but at this time it was probably receiving little from Gloucester as it was before the period of great expansion in the Droitwich saltworks. This trade from Cheshire undoubtedly continued: 29,584 bushels were brought from Liverpool in 1737[82]. For 1699, it is possible to compare shipments of salt to Bristol from Gloucester with those recorded leaving Gloucester. In that year, 33,840 bushels went to Bristol from Gloucester, according to the Gloucester Port Books, and 6,024 bushels left Bristol coastally, according to the Bristol Port Books[83]. Rock salt represented 4,154 bushels or about two thirds of the Bristol coastal re-exports, and the remainder was described as 'salt' or more often 'English salt', suggesting perhaps that little or no imports from France were present at this time, even though there was no war to disturb the trade. It seems that the new salt duties which favoured English salt and the 'ruinous prices' at Bristol for Droitwich saltmakers were having their effects. Bristol only redistributed to other coastal ports at most 6% of the salt that it received from Worcestershire in 1699. By 1735, however, it was redistributing 37,954 bushels[84], equivalent to 19% of the total that it received from Gloucester two years earlier and Liverpool two years later. Its role as an entrepot for salt was therefore increasing, and no doubt accounts for much of its growth as a receiver of salt from Gloucester in the period after about 1708.

The salt trade to Bristol as shown in the Gloucester Port Books and other evidence modifies Willan's earlier views that it had all its salt from Worcestershire, and that the Bristol salt trade only grew to importance in the eighteenth century[85]. In fact, it gathered its salt from several sources, of which Worcestershire was probably the most important, and was already an established salt trader, taking half the salt sent through Gloucester before the century began. It did forward rock salt and white salt along the coast, but not on a large scale until well after 1699.

Chepstow, the other destination nearest to Gloucester downstream, received much smaller amounts of salt than Bristol, but was still significant. Through most of the period after the 1690s it was the third ranking receiver of salt by volume after Bristol and south Wales. In 1697 it received only 600 bushels from Gloucester, but this rose quickly to 2,004 bushels in 1699 and 5,617 bushels in 1704, or 5% of shipments from Gloucester. With some fluctuation, this quantity continued to rise and reached a plateaux as recorded in the Port Books of over 20,000 bushels from 1722 to 1752, after

which the records become less reliable. In 1752 Chepstow was the destination for 10% by volume of salt shipped from Gloucester. Its increased share may have been partly connected with the gradual improvement of the Wye Navigation from about 1695 to after 1727[86]. As with the salt trade through Gloucester as a whole, there was a substantial peak in 1733 of 50,553 bushels.

No salt was recorded in the Chepstow Port Books for 1699 being re-exported coastally. It did however receive just 660 bushels of rock salt direct from Liverpool. It seems likely the salt was used for fishery at Chepstow or distributed through the great hinterland served by the Wye valley: certainly there are records of Hereford and Monmouth boats bringing salt from Gloucester[87], and much more may have been transshipped to Wye craft. Although mean shipment sizes to Chepstow grew, they were always small compared with other destinations. This may suggest that salt supply to Chepstow was opportunistic and followed given trade connections. A fairly high proportion of voyages going to Chepstow (such as those already mentioned to and from Bridgnorth) carried salt: 40% in 1699 and 72% in 1722 for example. The number of voyages to Chepstow did grow in parallel with the growth of the salt trade, at least as far as 1722, but it is likely this was no more than a contributory factor alongside more important changes in the iron and non-ferrous metals industries[88].

South and south-west Wales also were relatively important markets for salt from Gloucester. Cardiff and Swansea, in particular, were important places for the receipt of salt, brought by their own boats or boats from a few Severn ports, especially Upton. The two regions of southern Wales took 3,950 bushels in 1699 or 6% of the trade from Gloucester. They must also have received salt from several other sources, sometimes in much larger quantities. In 1690, according to Willan, Liverpool shipped some 70,000 bushels to south and south-west Wales[89]. In 1699, 11 voyages brought salt from overseas into Pembrokeshire alone[90], and French salt was being imported directly to Swansea and Neath[91]. They also made salt themselves from seawater and/or rock salt[92], and had some transshipped from Bristol: in 1699 Bristol sent 1,207 bushels of salt on 13 voyages. Salted foods were an especially important part of the diet in south Wales, with its more limited agriculture, whether it was to make cheese, to salt meat or to preserve herrings. A commentator at the end of the eighteenth century said that in Pembrokeshire 'our labouring poor live almost entirely upon bread and cheese, milk, and vegetables; except when herrings are plentiful on the coast...'[93]. Southwest Wales in particular had a strong herring fishery at this time, but even Cardiff was populated by many fishermen[94]. The herring fishery was particularly important, as an export trade for the region, but hake and other fish and oysters were also caught[95]. It was also an important producer of cheese and butter which required salt. Salt supply to southern

Wales from Gloucester increased at the same time as the salt trade of the Severn increased generally. By 1722 it amounted to 28,605 bushels, or 15% of that shipped out of Gloucester. The fact that Bristol's salt trade decreased at the same time suggests that it may have begun to get more of its supplies directly rather than through Bristol. Unlike Bristol and Chepstow, however, it did not take part in the boom of trade around 1733. In that year it still only took 25,799 bushels, which was only 9% of the total. This suggests strongly that the lower prices of Droitwich salt which created a boom in places like Bristol and Chepstow which were readily supplied did not have the same effect in more distant parts, especially those more accessible to supplies of cheap Cheshire salt following the opening of the Weaver in 1732. The same was true ofsouth-west England. The quantities of salt supplied to southern Wales from Gloucester was static or fell slightly to the end of the period studied, probably for these reasons.

The last destinations of importance were Somerset, Devon and Cornwall. These were regions eager for supplies of salt, which were the mainstays of their large fishing industry. Indeed, the availability of salt historically has been one of the chief factors determining the locations of the fishing industry[96]. The counties of the south-west were the principal ones in Britain involved in the Newfoundland cod fishery for a century after 1660, sending 94 of the 207 vessels clearing England for Newfoundland in 1699[97]. They were also involved in the herring fishery, and Devon and Cornwall were important nationally for mackerel, and pilchards[98]. Defoe wrote in the 1720s, 'The trade of [Bideford] being very much in fish, as it is also of all the towns on this coast, I observed here, that several ships were employ'd to go to Leverpool...to fetch rock salt'[99]. Clearly, the south-west brought salt from wherever it could.

Straightaway when the Severn salt trade began its expansion, it took 23,999 bushels from Gloucester in 1697, an extraordinary 53% of the total. After this enormous lead it did not grow as much as the trade to some other destinations. By 1708 Somerset received 46,077 bushels of salt from Gloucester, mainly brought to Bridgwater, but with some also to Minehead. North Devon and Cornwall received 8,082 bushels, mainly at Barnstaple, but also at Bideford, Ilfracombe and Lynmouth. The south-west altogether therefore took 54,159 bushels, or 34% of the salt from Gloucester by volume. This pattern of salt dealing was in strong contrast to the pattern of trade as a whole from Gloucester. Only 12% of all voyages from Gloucester were to the region. The importance of salt to the region is shown by the fact that in many years nearly 100% of voyages from Gloucester carried salt, and the mean shipment sizes on those voyages were almost always the highest of any salt cargoes out of Gloucester. In 1708 the mean shipment to Somerset was 1,245 bushels and to Devon and Cornwall 1,155: nearly double the size of those to Bristol and Chepstow.

The trade to the south-west was still larger in 1715, at 66,424 bushels. By this time the domination by the Somerset ports in particular had become greater. The south-west as a whole received 31% of Gloucester's salt, but Bridgwater and Minehead took 97% of that, the remainder being on one voyage to Ilfracombe. Bridgwater was a specially important consumer owing to its access to inland markets via the rivers Tone and Parrett as far as Ham Mills and Langport, and even Taunton after 1717[100]. In 1722 the trade fell somewhat, with 36 voyages from Gloucester, carrying 48,895 bushels. It was almost the same in 1733, at 48,331, despite the huge increase of Gloucester's salt trade overall in that year. At this time the south-west received only 16% of the salt by volume. As with southern Wales, the reason for this failure to participate in the boom was most likely that an ample supply was available from the newly-opened River Weaver, combined with the growth of transshipment at Bristol. The amounts carried to the south-west remained fairly stable in the remainder of the period studied; the only difference being that they became entirely focused from 1752 on Bridgwater and, to a much lesser extent, Minehead. This took to its logical conclusion the pattern of dominance that Bridgwater had shown since the salt trade from the Severn began. Given the much greater market that must have existed for salt further down the peninsula, it indicates clearly the importance for River Severn craft of not sailing too far out of protected estuarine waters. Merchants like Hoar and Company of Bridgwater could get salt from Droitwich by trow and then send it on again to places like Truro and Plymouth[101]. As a consequence, Bridgwater seems to have consumed less salt from Cheshire than did its neighbours: in 1735, according to Willan, it received 40,960 bushels from the Severn and only 16,347 from Liverpool. None of the salt seems to have been sent on coastally to Devon and Cornwall, but must have been used in the Somerset fisheries and in the large hinterland of the rivers Parrett and Tone[102].

More generally, the salt brought to the south-west from Gloucester appears to have been a small part of its total consumption. Some salt, from both Worcestershire and Cheshire, was forwarded via Bristol. Of the 6,024 bushels sent out of Bristol coastally in 1699, 3,076 bushels were to the south-west; and in 1734/5 the largest part of the 37,954 bushels it sent out coastally were for Devon and Cornwall[103]. It seems that one reason for the relative decline in salt brought directly from Gloucester after about 1722 was that more was being transshipped at Bristol. Willan did not find salt coming coastally into Bideford and Barnstaple in the eighteenth century except from Bristol[104]; however it did also come from Liverpool in 1699[105]. In the eighteenth century, Defoe, as has been said, remarked on ships employed between Liverpool and the two ports with rock salt. More was brought to Devon and Cornwall from overseas by direct trade with Spain and Portugal or triangular trade via Newfoundland[106].

It is possible to make some approximate calculation of the quantity of fish that could have been cured using the salt sent from Gloucester to the south-west, had it all been used for that purpose. 32 gallons of white herrings required 140 lb of salt to cure them, red herrings 65 lb and mackerel 84 lb[107]. On this basis, the salt sent from the River Severn to Somerset, Devon and Cornwall in 1733 (nearly 11 million lbs) would have been enough to have cured perhaps between about two and a half and five and a half million gallons of fish[108]. Considerably more would have been cured with salt forwarded from Bristol, Liverpool and overseas.

The growth of the trade in salt undoubtedly had an important impact on trading patterns to the south-west. In 1684 there were four voyages to the south-west of England from Gloucester; in 1699 there were 32; in 1708 there were 47. In most years between 90% and 100% of these voyages were carrying salt, usually in exceptionally large quantities. The largest part of the salt to the south-west from Gloucester was carried on vessels from the Severn valley. In 1715 for instance, of the 42 voyages carrying 66,424 bushels to the south-west, 25 were on Bewdley boats with 50% by volume, seven on Tewkesbury boats (with 18%), eight on Upton boats (with 28%), and two on Worcester boats (with 3%). The salt carriage therefore established a regular communication with the middle and upper parts of the Severn valley which provided opportunities for the carriage of other goods. Owing perhaps to difficulties both of physical navigation in the river and the difficulties of wresting salt cargoes from ports closer to them, boats from the south-west were seldom involved in the trade. The limit to their activity from 1704 to 1708, for example, seems to have been little more than a couple of voyages a year by boats of Bideford or Bridgwater.

iv. Trade fluctuations and seasonality

In addition to the long-term changes in the salt trade which have been discussed, there were fluctuations in trade from year to year and season to season. The sample of five continuous years for this study allows these shorter-term variations to be examined for the period 1704-8. Variations in the total quantity of salt carried were quite considerable (Table 5.2). Annual salt shipments downstream varied between a minimum of 113,112 bushels and 159,953: respectively 10% below and 27% above the five-year mean of 125,937 bushels. Much of this variation must be accounted for by the fact that this was a period of rapid growth in the salt trade; but the period was not characterised simply by growth from year to year. The quantity of salt shipped in 1704 and 1705 was identical, and in 1706 it fell slightly. It was only in 1707 and 1708 that it grew markedly. It is also worth noting that variations in the amount of salt shipped by

particular home ports and to particular destinations were often subject to even greater variation. Thus, whilst shipments to Bristol were higher in 1708 than a year previously, to south Wales they were lower (Table 5.9). Whilst the amounts of salt carried on Bewdley boats varied little over the period, those carried on Worcester boats fluctuated much more wildly (Table 5.5).

Whilst variations in the short term were small compared with the long-term development of the trade, they were appreciable, suggesting that the salt trade was affected by many different factors on a regular basis. It is impossible to state with any certainty what the most important of these factors might have been; it is only possible to suggest that influences such as the fishing catch, the effectiveness of salt production, and the ease of supply from other sources were the principal ones. Variations for particular destinations and home ports may have depended to a great extent on changing patterns of transshipment, as well as factors of demand and supply. The variations from 1704 to 1708 illustrate clearly that the results of analysing other sample years must be taken with some caution. This study must be more assured of identifying long-term patterns than that of Willan, who relied on a much smaller number of sample years; but studies using individual sample years will always suffer from the risk that they give an unrepresentative view.

Variation was not only in terms of the total volume of salt shipped but also the numbers of voyages and the mean shipment sizes carried. The range of voyages with salt in the five years was from 126 to 197: 18% below and 28% above the mean. A comparison of this variation with that of the salt trade by volume suggests, surprisingly, that the number of voyages varied slightly more than the quantity of salt. This indicates that whereas vessels carried larger shipments of salt over a long period, they did not have the capacity to expand their shipment size in the short-term. This may have been caused by the difficulties of competing for salt to carry, however it may also suggest that the increased cargo sizes of later years relied on increased sizes of boats or more specialist boats carrying just salt. The only way to cope with an increase of trade in the short term was to make more voyages. Mean shipment sizes varied during the five years as follows:

1704	865 bushels
1705	906 bushels
1706	826 bushels
1707	728 bushels
1708	812 bushels

The five-year mean of 827 bushels saw a maximum variation of 12% below and 9% above. Whilst vessels were able to carry less than usual when necessary, therefore, this confirms that it was difficult to expand the amount they could carry. By the busy year of 1733, however, vessels carried a mean shipment of 1,575 bushels.

The seasonality of the trade in salt displays some delightfully clear patterns if the monthly shipments are expressed in terms of a mean for the five years 1704-8 (Table 5.13). It is an excellent example of how slight variations apparent in terms of voyages per month can in fact conceal much greater and more consistent variations if the volumes of a commodity are considered. Whereas the busiest month had less than twice as many voyages with salt as the quietest, these carried more than three times as much salt by volume. The increase in mean shipment size in those same months was significantly less than double, but the combination of more and bigger cargoes achieved greater growth in volume. Again, this indicates that shipment sizes could not readily be expanded, and it was necessary for more voyages to be made. It is notable that the lowest and highest months *for mean shipment size were April and August, whereas* those for both salt by volume and number of voyages were February and October, again indicating an inability to maximise shipment sizes when they were most needed. It seems that the extent to which vessels that were already travelling with other goods took on salt was limited and not greatly dictated by the amount to be shipped. The percentage of all voyages downstream which carried salt did vary, but only from a minimum of 34% to a maximum of 52%; and this variation though it followed the general seasonal pattern of the trade was not closely fitted to it. The peak of 52% in June for instance matched was in a month when the quantity of salt actually carried was a third below the average. If merchants wanted more salt carried they had to put most emphasis on getting more voyages and maximising their cargoes rather than hoping the increase could be accommodated within existing patterns.

The seasonality of the salt trade overall displays a remarkably clear pattern through the year. There was a smooth curve of trade coming to a peak in the autumn and a trough in February and March. This indicates clearly the importance of salt in preserving food, and in particular fish. Newfoundland fishing boats set off from Bristol and from Devon in March or April, when the trade was beginning to pick up from its trough in February, and were followed by 'sack' boats to serve them into the summer. Many of the Newfoundland boats collected salt from France, but it is likely many also took salt from Devon, if only to give ballast[109]. Mackerel were most plentiful in June, when the trade expanded again from its lower period[110]. Above all, however, the figures confirm the enormity of demand created by the herring fishery, which was of exceptional importance to the whole region from Pembrokeshire to Cornwall[111], and

Table 5.13

Recorded downstream trade in salt, by month, 1704-8

Monthly salt shipments downstream, 1704-8 inclusive

	Salt carried (in bushels)			Numbers of voyages with salt			Mean	
	Bushels 5 years	Mean per month	Percent of total	Voyages 5 years	Pc of all voyages	Mean per month	shipment size	All voyages
Jan	41519	8304	6.67%	57	33.73%	11.4	728	169
Feb	27085	5417	4.35%	44	37.29%	8.8	616	118
Mar	34947	6989	5.62%	57	39.31%	11.4	613	145
Apr	34024	6805	5.47%	61	37.65%	12.2	558	162
May	41801	8360	6.72%	56	41.18%	11.2	746	136
Jun	41796	8359	6.72%	68	52.31%	13.6	615	130
Jul	56225	11245	9.03%	73	43.98%	14.6	770	166
Aug	64517	12903	10.37%	56	47.06%	11.2	1152	119
Sep	74752	14950	12.01%	76	52.05%	15.2	984	146
Oct	81331	16266	13.07%	82	45.56%	16.4	992	180
Nov	69977	13995	11.24%	77	47.83%	15.4	909	161
Dec	54404	10881	8.74%	61	39.87%	12.2	892	153
TOT	622378		100%	768				1785
12 month mean		124476				153.6	810	

came to a glut from about mid September to mid October[112] (the two months with the peak salt trade 1704-8). The herring fisheries were the main commercial ones of Europe from the Middle Ages to the twentieth century[113]. The rise in mean shipment size to a sudden peak in August may indicate that traders were supplying salt in preparation for the herring glut. Other uses of salt, in making cheese and preserving meat, would have continued more evenly around the year, and perhaps an idea of the importance of the fisheries is given by the difference between salt shipped in February, when fishery was at its minimum but just over 4% of the salt traded in a year was still being carried. At a guess, this might suggest that in the twelve months of the year at most some 48% of salt went to purposes other than fishery; but such an estimate can only be highly speculative.

v. Organisation

The organisation of salt trading is a subject for which there is little published work or known evidence. Hughes, in his mammoth work on the salt industry, did not tackle the subjects of carriage or marketing, and Westerfield's discussion of middlemen in the salt trade went no further than to opine, 'The salters or owners of phates appear to have done their own marketing'[114]. The Port Books therefore provide an insight where one would otherwise not be possible.

Tables 5.14 and 5.15 list the merchants who carried salt in the year 1697, at the beginning of the expansion of the Droitwich salt trade, and 1733, when it was at its peak. The trade in 1697 was in the hands of 34 different merchants, with no real specialists. Some of the merchants carried large amounts of salt, but all of them carried other goods as well and the vast majority carried salt only on some of their outward voyages. Also there were many merchants who only carried small amounts of salt during the year. Ten merchants (or 29% of the merchants carrying salt) carried during the year more than the mean of all merchants. However the majority of the total salt trade by volume was carried by the top three merchants: Charles Corker, Joseph Powell and William Perkes.

Corker, Powell and Perkes were all from well-established trowmen's families who were general carriers. In this sense they were well-placed to enter the downstream salt trade as soon as it began. Charles Corker mainly travelled between Bewdley and Bristol before the rise of the salt traffic, but did make occasional voyages to Bridgwater, which was to become one of the most important places for the consumption of salt. He carried salt on nine out of his 15 voyages in 1697. By this time his business was almost entirely focused on Bridgwater, and 14 out of his 15 voyages went there. However, he

Table 5.14

Merchants recorded carrying salt downstream in 1697

Merchants carrying salt out of Gloucester
In 1697

	Merchant	Port	Voyages	Bushels	Mean Shipment
1	Charles Corker	BWD&1	9	9467	1052
2	Joseph Powell	TWK	7	7520	1074
3	William Perkes	WRC	18	4151	231
4	John Hooper	UPT	3	2858	953
5	Thomas Jefferies	UPT	5	2360	472
6	Francis Perkes	BWD	2	2178	1089
7	John Chance	WRC	22	2141	97
8	George Perkes	BWD	2	2000	1000
9	Thomas Claroe	UPT	4	1434	359
10	Henry Baily	GLC	2	1340	670
11	John Glover	TWK	5	1202	240
12	Thomas Tyler	WRC	1	1200	1200
13	William Fisher	TWK	2	900	450
14	John Jones	SLP	10	824	82
15	Edward Jackson	BRI	1	800	800
16	John Beale	BWD	1	800	800
17	Stephen Perkes	BWD	3	603	201
18	Edward Bryan	TWK	1	600	600
19	Edward James	WRC	4	470	118
20	William Lewis	GLC	1	400	400
21	Richard Farley	SLP	3	337	112
22	Richard Lewis	GLC	4	321	80
23	John Farley	SLP	1	286	286
24	Richard Hitchinson	WRC	2	193	97
25	Francis Asbury	BRI	2	182	91
26	John Dooding	WRC	2	154	77
27	Daniel Farley	SLP	1	139	139
28	Philip Load	GLC	1	98	98
29	James Young	WRC	1	70	70
30	William Hancocks	SLP	1	57	57
31	William Tyler	WRC	1	49	49
32	James Davies	GLC	1	48	48
33	John Coldrick	BWD	2	9	5
34	William Smith	BWD	1	3	3
	TOTAL		126	45194	
	Mean per merchant		4	1329	
	Median carried			602	
	Overall mean shipment size				359

Table 5.15

Merchants recorded carrying salt downstream in 1733

Merchants carrying salt out of Gloucester
In 1733

	Merchant	Port	Voyages	Bushels	Mean Shipment
1	Edward Jackson	---	38	77837	2048
2	George Bradley	---	41	67582	1648
3	Benjamin Beale	---	26	36119	1389
4	Graffin Prankard	---	17	28836	1696
5	George Lewis	---	11	10508	955
6	William Bullock	---	7	9929	1418
7	John Beale	---	4	9422	2356
8	Francis James	---	5	8265	1653
9	Edward Phillips	---	6	6215	1036
10	William Hide	---	2	5997	2999
11	Thomas Steward	---	4	5343	1336
12	George Clark	---	2	4478	2239
13	John Oakes	---	2	3980	1990
14	John Franks	---	3	2989	996
15	James Norris	---	1	2515	2515
16	Thomas Beale	---	1	2420	2420
17	Peter Jackson	---	1	2388	2388
18	John Owen	---	2	2277	1139
19	Richard Bullock	---	2	2011	1006
20	Anthony ***	---	1	1640	1640
21	James Glover	---	1	1600	1600
22	Richard Farley	---	1	1478	1478
23	Phillip Powell	---	2	800	400
24	William Clifford	---	3	760	253
25	William Bradley	---	2	710	355
26	Robert Avery	---	1	600	600
27	Daniel Farley	---	1	480	480
28	*Chris Playsted*	---	1	240	240
29	*Michael Cox*	---	1	160	160
	TOTAL		189	297579	
	Mean per merchant		7	10261	
	Median carried			2515	
	Overall mean shipment size				1574

carried a wide range of goods, and it is not clear whether he dealt in salt in his own right or simply carried it for others. One of the dealers with which he dealt in Bridgwater was Hoar and Company. Their records show him owing small debts to them, probably for minor goods like wine that he took back up river on credit. Large quantities of salt were sold by Hoar and Company from Corker's boats around 1699, but their books do not appear to record any payments to him for salt or anything else. They do; however, contain references to payments to people in Droitwich and Worcester who may have been salt merchants and who paid freight to Corker[115].

Joseph Powell, also, was a general trader, of Tewkesbury. He had some experience before the growth of the salt trade of voyages to places like Newport and Minehead as well as Bristol, and it is clear his vessels was suitable for the trade to Bridgwater. He carried salt on seven out of his ten outward voyages in 1697, with a large mean shipment size of the time of 1,074 bushels. All of these were to Bridgwater or Minehead. He, too, carried a wide range of goods.

William Perkes, the third largest salt trader in 1697, carried salt on 18 out of his 24 downstream voyages, but with a mean shipment size less than a quarter that of Corker and Powell, at only 231 bushels. He, too, was a carrier of many different commodities. Unlike the other two merchants, however, his trade was entirely focused on Bristol, with the exception of one voyage to Minehead and one to Cardiff. This situation had been the same before the salt trade of the river had developed. Despite this limitation, he did have the advantage of being based at Worcester, which was the chief market for Droitwich salt and where he could much more readily get cargoes.

By 1733 the trade had grown enormously. However, the salt trade was now in the hands of a rather smaller group of people, of whom the largest were very large indeed. Only five merchants carried more than the mean and nearly half the trade was now in the hands of just two merchants. A good deal of smaller merchants were still involved in the trade with one or more small shipments, however. The leading person in the trade was Edward Jackson, who carried over a quarter of the salt for the year on 38 voyages, with a mean shipment size of 2,048 bushels, and only made one voyage without salt. Jackson traded with Bristol and Chepstow, also carrying mixed cargoes. The Jackson family had specialised for many years in voyages from Bridgnorth to Chepstow and Bristol. They operated boats out of Brockweir as well as Bridgnorth, and in 1707 moved to Worcester, after which they did not operate Bridgnorth boats[116]. Presumably, the move to Worcester was to participate in the lucrative salt trade and operate on the more easily navigated lower stretches of the river.

The second largest carriers of salt were the two George Bradleys (father and son), who also had Worcester connections[117]. In 1715, for example, they operated

boats of both Montgomery and Worcester; but by 1722 were recorded by the Port Books as operating boats from Worcester only. The Bradleys, too, were general merchants. They carried salt on 41 out of their 42 recorded downstream voyages in 1733, all of which went to Bristol.

Some of these merchants named in the Port Books can be looked at in more detail. It might be expected there would be different types of salt carrier, perhaps fitting the following classes:

1. Carrying merchants who were salt producers;
2. Carrying merchants who were salt dealers and bought and sold salt on their journeys, either as specialists or general traders;
3. Carriers who took salt as freight on board their regular services;
4. Carriers who had their vessels chartered for salt carriage by producers or dealers, and who might or might not load additional goods.

In order to discover some of the merchants who may have been Westerfield's 'salters or owners of phates' who did 'their own marketing', it is possible to consult two lists of the salt proprietors at Droitwich, in 1694 and 1732, and to compare these with the names of merchants in the Port Books[118].

The 1694 list contains 21 names, to which can be added that of Robert Steynor, who was not an official proprietor but was the man who broke the monopoly during the 1690s. None of these people were 'merchants' recorded carrying salt in the Gloucester Port Books for 1697[119]. This may have been because they only operated in the upper river or because they employed other carriers, but it seems to disprove any notion that, at this time, salt pan proprietors were commanding river trade directly. It confirms the impression of the structure of the trade at this time that the dealers in salt were established river trading families.

The 1732 list of salters at Droitwich also contains 21 names. One of these names is both on the list and appears in the Port Books as a carrier of salt; and it is an exceedingly uncommon name: G[raffin] Prankard. Prankard appeared in the Port Books in both 1733 and 1741/2, as well as in other years, and was a salt carrier of considerable importance. In 1733 he was named in the Port Books as the merchant for 17 voyages carrying in total 28,836 bushels. This represented nearly 10% of all the salt carried through Gloucester in that year. He seldom carried anything other than salt, he always carried to Bristol, and he never returned with any cargo. It is not clear whether he carried only his own salt or that of other producers also. The amount that he carried did approximately amount to one 21st of the estimated output of the region, however.

Given the dubious assumption that he was an average proprietor, this suggests he carried only his own salt, or a little of other people's. In 1741/2 he carried 27,052 bushels, again all to Bristol, representing over 11% of the trade in total and 19% of that to Bristol in particular. His mean shipment was of 1,932 bushels, compared with a mean of all the salt traffic in that year of 1,585. His shipments were never less than 1,820 bushels and the largest was 2,400, displaying not only a large size of shipment but considerable regularity. A fuller account of Prankard's career is given in the following chapter. It is probable from analysis of the boats and masters with which he worked that in 1733 he owned at least two boats, the *Providence* and the *John and Betty*, which he operated on 15 of the 17 voyages with numerous different masters: boats of these names were never operated with any other merchant than Prankard, nor with any other sole cargo. It is known that he owned a substantial ship in the trans-Atlantic trade in 1740[120]. He may have hired out boats for the two remaining voyages, both of which made other voyages with different merchants[121]. In some cases he may not have been recorded in the Port Books as merchant when doing this: the Peace was a vessel he apparently hired in 1733, but it also made a voyage carrying almost exclusively salt with John Oakes, its usual master, listed as merchant. By 1741/2, however, Prankard seems to have given up having his own vessels and have hired out vessels associated with the Owen family[122]. This change almost certainly came about as a result of his bankruptcy in July, 1740.

Also on the 1732 list of Droitwich proprietors was Richard Bullock, who might perhaps have been the same person recorded in the Port Books with 2,011 bushels on two voyages in 1733, and must have been related to the William Bullock who carried 9,929 bushels on seven out of the eight voyages he made as merchant[123]. The Bullocks between them carried 11,940 bushels or 4% of the salt carried through Gloucester in that year and combined were the fifth largest salt shippers on the river. They made all except one of their voyages to Chepstow, providing 24% of the salt sent there from Gloucester. During the year they used seven different vessels and masters for their salt, but only rarely carrying anything except salt. It is unclear whether any of these boats belonged to the Bullock family, but it seems certain that several of them did not. They used the *Happy Return* and the *Betty* which were normally associated with the Owen family, the *Duchess*, which belonged to the Bradleys, and the *Thomas and Mary* which probably belonged to Edmund Phillips. Since no boat was used more than twice, it seems clear that the Bullocks chartered vessels when they needed them. They obviously had trading links with Chepstow, to which there was no convenient regular service which they could have used instead. References to William Hide in both sources were almost certainly to the same person. He appeared only twice in the

Port Books for 1733, on both occasions with different boats carrying just salt. Both of these vessels were ones which belonged to John Beale of Bewdley and were navigated by one of his usual masters. Both of the voyages were made to Bristol in April 1733. Perhaps it was only in exceptional circumstances that Hide chartered a vessel, and he usually paid freight for John Beale to carry. On the other hand, with these two shipments alone he was the tenth largest salt merchant by volume named in the Port Books. A James Norris who appeared in the Port Books for 1733 may have been connected with Richard and Thomas Norris who were both listed as Droitwich proprietors in 1732. He was a merchant on the *Endeavour* to Bristol carrying 2,515 bushels of salt and nothing else. It seems likely that this, too was a chartered vessel. Finally, one other Droitwich proprietor, John Glover, might have been connected with the long-established family of Tewkesbury trowmen of that name, who regularly carried salt before and afterwards. One Glover boat carried 1,600 bushels of salt in 1733, but otherwise the Glovers did not appear on the river in that year.

Contrary to notions of the rise of the middlemen recognised as a part of the commercial revolution of the period, it seems that in the salt trade the producers themselves increased their prominence significantly between 1697 and 1733. By the latter date it is clear that some of the proprietors at Droitwich had a deep involvement themselves or within their families in carrying their own goods on the Severn. They were only a small proportion of the salters (probably five or six out of the 21), but others may have been involved in similar ways in trading with the areas above Gloucester and overland markets which as has been shown above, consumed probably two thirds of the salt produced at Droitwich.

Many other carriers were involved in the salt trade of the Severn, even in 1733. Some merchants operating on the river seem certain to have been buying and selling salt themselves even though they were not owners of salt pans. One example of these was Isaac Seacombe of Swansea, who was a regular carrier of salt between 1706 and 1731. He, like Prankard, always carried salt and rarely anything else with it. Unlike Prankard, however, he was usually both merchant and master of his vessels. He operated two boats between 1706 and 1731: the *Rose* from 1706 to about 1716 and the *Violet* from then until 1731. It seems clear that these were his own boats and that he bought and sold the salt he carried. His voyages were almost exclusively from Gloucester to Swansea (and he seems to have made only one inward voyage in the period), but he occasionally took salt to Neath and other places[124]. It may be an indication of his independence as a merchant in the trade that the amounts of salt he carried were small. In 1708, for example, he made seven voyages and carried 2,709 bushels. This was all of the salt sent from Gloucester to Swansea in that year. In

1722 he made five voyages to Swansea and one to Padstow, carrying 4,187 bushels to Swansea and 835 bushels to Padstow. Again, he was the only carrier of salt from Gloucester to those two places, directly at least. His mean shipment size was therefore small: 387 bushels in 1708 and 835 bushels in 1722. This varied little from voyages to voyage, and the discontinuity in mean size is clearly apparent at the time that he changed vessels in about 1716. It appears likely that he was carrying to capacity on most occasions.

It is difficult to guess how many others of the traders on the river were buying and selling salt in the way that Seacombe probably did. It seems likely that some were involved in similar ways. Many other salt dealers may have been carrying the salt of Droitwich to its inland markets or places higher on the river.

The salt trade more than many others on the river seems to have contained specialists like Prankard and Seacombe who carried salt on their own account. However many others, including the largest merchants in the trade, were carrying salt alongside other commodities on a fairly irregular basis. One example of this kind of carriage was probably Charles Corker, who has been discussed already.

Another probable example is provided by the Beale family of Bewdley. In 1733, Benjamin Beale carried salt on 26 of his 29 outward voyages, with a mean shipment size of 1,389 bushels. He was the third largest salt carrier on the river, but this may be accounted for by the fact that he operated a regular packet service to and from Bridgwater. This went twice a month and carried large and very mixed cargoes, largely of goods like glass, iron and earthenwares which were traded through Bewdley. Thomas and John Beale, by contrast, operated to Bristol, and were required to carry much less salt, taking it on only five out of their 30 voyages in the same year. It is clear from their regular patterns of voyages that the Beales were not usually chartered to carry salt, although their boats may have been chartered on certain occasions for other merchants. It also seems certain that the Beales did not buy or sell salt, but carried it for orders on their regular services. Several pieces of evidence suggest this. First, the great range of cargoes that they carried suggests that many different people were bringing goods to them, and is at odds with the typical cargoes of people like Prankard and Seacombe who were clearly specialists. Second, Benjamin Beale's shipment sizes were much smaller than those of other merchants: in 1733 they averaged 1,389 bushels, compared with a mean for all merchants of 1,574. This is purely circumstantial evidence, but there is some stronger evidence also. In an Exchequer Court case of 1727, John Bayly, trowman of Gloucester, stated that John Beale was 'a Common Trowman or Carryer and that he Carrys goods in his said Boates or Trows for all manner of psons for freight or hire as other Trowmen usually do', and William Coldrick

agreed, saying that various goods 'the said Deft generally carried upon hire for Merchants and Tradesmen who pay him for the freight and Carriage thereof'. However, two other witnesses suggested that Beale did carry 'Severall goods of his own and Severall other goods for other persons for hire as he can get freight'[125].

Clearly, the mainstay of the business was simple carriage for freight, though the Beales would buy and sell some goods if a good opportunity arose. The final piece of evidence is a newspaper advertisement in 1783, at a time when the Beale family had every opportunity to be leading merchants. The advertisement was placed by Samuel Stuckey[126], a saltworks proprietor at Droitwich who was offering to supply salt at Bridgwater: 'Ben Beale's Trows are constantly sent from Bewdley to Bridgewater every spring tide; and from his present connections with Mr. Samuel Stuckey, he assures his friends and the public, that they will not experience those delays which were unavoidable in him, whilst he was unhappily engaged with Mr. Burlton...'. Customers were asked to apply to Messrs. Stuckey and Bagehot in Langport, George Beale in Bridgwater or Benjamin Beale at Bewdley[127]. The implication of this is clearly that Beale was a carrier who dealt for a salt proprietor, not a merchant buying and selling salt in his own right.

Some clear examples of vessels being chartered for salt carriage can be seen in the accounts already made of merchants like Prankard. It is clear that when Prankard could not take all his salt in his own vessels, he hired other river carriers; he then appeared as the merchant in the Port Books, but the master of the vessel was one of the 'owners' or trowmen of the river who were normally merchant of the same vessel. On these vessels salt was the only cargo, except for a few occasions when other items of little significance were added. Prankard was forced to use other people's boats in this way all the time after his bankruptcy in 1740.

Another example of this method of carriage is shown in the activities of William and Richard Bullock. It seems clear, as discussed already, that these people had proprietorial interests in the salt industry. When they appeared in the Port Books in 1733 they used a large number of different boats and masters for just a few journeys, although they appeared as the merchants themselves and the boats almost always carried just salt. On these occasions the voyages were all but once to Chepstow, but the masters of the vessels were people who did not normally go there and traded more regularly with Bristol. William Hide and James Norris appear to have operated in exactly the same way in their three voyages in 1733.

Whilst a great deal remains to be learned about the mercantile organisation of carrying in salt on the Severn, it seems clear that the categories of operation outlined above did all exist. It is also clear, however, that these categories frequently

overlapped. Merchants like Prankard who were salt producers and had their own vessels would also occasionally charter vessels, or possibly even pay freight for the carriage of their salt. Whilst it is possible from the Port Books to identify these categories and to see that certain individuals belonged to them, detailed prosopographical studies are needed of mercantile and industrial communities throughout the River Severn's trading region before a quantitative estimate can be made of the extent to which the different models held sway over the trade at different times.

Before the 1680s the Severn valley salt trade, although it was already large, did not extend profitably into the Bristol Channel region. Costs of salt production and transport were the most significant factor in determining trade patterns. It seems likely that temporary and partial navigability of the Salwarpe in about 1666 caused the short-lived boom in down-river trade and the hiatus in up-river trade at that time. The sinking of new brine pits at Droitwich outside the borough's traditional monopoly in 1693, by drastically reducing production costs, created a lasting dominance of Worcestershire salt exports over the salt trade of the valley. This received filipps in 1694 and again in 1698 with substantial increases in salt duties which gave domestically produced salt a considerable advantage in the market. These changes were instrumental in opening up connections with the south west and South Wales for the first time on a large scale. Salt was a staple traffic of the Severn trade in more ways than one.

The enormous growth of the Droitwich salt trade at this time as reflected in the Gloucester Port Books suggests that the protectionist policy for the salt industry was highly effective. A further, if smaller expansion, was stimulated from about 1715 with the improvement of the Droitwich to Worcester turnpike and the expansion of fishing in the south-west. The trade appears to have been hit hard from the late 1730s by internal problems of the Droitwich industry and by the opening of the Weaver navigation.

CHAPTER 6.

THE TRADE IN TOBACCO

Tobacco is widely acknowledged by historians to have been an important contributor to the development of the seventeenth and eighteenth-century economy. Having been introduced to England around the beginning of Elizabeth's reign, smoking became widely fashionable by the 1590s[1], though the quantities used were still small. Declared imports of tobacco grew by an astonishing 260-fold between 1615 and about 1700; representing a transformation in supply on the one hand and the creation of an entirely new mass market on the other[2]. As the earliest of the great colonial imports, tobacco set the way for other important commodities which followed close behind it like sugar and tea and helped to establish English prominence in trade with the New World[3]. Of all imports between 1699 and 1701, tobacco represented just over 4% by value; but owing to the value added to it, it figured even more highly in exports, at nearly 7%[4]. According to MacInnes, the chief historian of the trade, 'by 1700 tobacco was universally recognised as one of the mainstays of English commerce'[5].

i. The tobacco trade and its analysis

The vast majority of the tobacco consumed in England or re-exported came from North America, and especially the plantations of Virginia and Maryland. Commercial plantations were established in Virginia in 1612. However tobacco also came from the West Indies plantations (the first established in 1614)[6] and from Spain. Spanish tobacco was the only foreign tobacco permitted into the English market, and then only with the considerable disadvantage of its much higher import duty[7]. The Navigation Act of 1660 excluded foreign traders from carrying English colonial produce and thereby focused tobacco shipment substantially on England[8]: it could now not legally be carried from its main growing areas to its main markets except through English ports. In addition to this, however, an unknown quantity of tobacco was grown illegally in England during most of the seventeenth century, despite persistent attempts to stamp it out[9].

The internal trade in tobacco grew rapidly, but not as rapidly as did the trade as a whole, since most of England's imported tobacco was destined for re-export to

other European markets. Internal trade in the commodity, partly for this reason, has been little studied in comparison with its foreign counterpart. Around 1700, annual declared tobacco imports were worth about £249,000; but re-exports were worth some £421,000 owing to the increase in the unit price of the commodity while it passed through England[10]. In terms of volume the vast majority of tobacco was re-exported. In 1722 nearly 29 million lbs were declared to have been imported, but only seven million, or under one quarter, to have stayed in England. Even given that the amount retained in England was almost certainly underestimated, the greatest economic importance of tobacco was therefore not as a good produced or consumed in England so much as a creator of capital through international trade.

The wealth created in England by tobacco was considerable. Many fortunes were built upon it, especially in the ports most prominent in its importation and re-export, notably London, Bristol and Liverpool. Large amounts of capital were raised by merchants and others with an interest in the trade, such as the Lowthers of Whitehaven from the 1680s to the 1740s, which were re-invested in different industries and trades[11]. Many merchants in Bristol also made fortunes from tobacco: according to MacInnes 'It was as a great tobacco and sugar port that Bristol became famous throughout the world, and it was upon trade in these two commodities in particular that the fortunes of her merchant princes were reared'[12]. Bristol was easily the most important port in the country after London in terms of its Customs revenue throughout the later seventeenth century, and half of the ships arriving there came from the tobacco and sugar producing colonies of the new world[13]. Tobacco was among a small set of trans-Atlantic imports which Ralph Davis considered to be vital to English commercial development,

'...the English merchant class was able to grow rich, to accumulate capital, on middlemen's profits and on the growing shipping industry which was needed to carry cheap sugar and tobacco, pepper and saltpetre on the ocean routes. Because these sources made their great contribution to English foreign trade in the century after 1660, and in that century made great demands on the nation's capital, perhaps we should look with a little more favour on those historians of the past who dubbed this century with the title of 'The Commercial Revolution'[14].

The trade created considerable wealth for the Crown as well as for merchants, through the exceptionally high duties imposed. After the initial introduction of duty at the end of the sixteenth century, the rate on tobacco was hugely increased in 1604, 1631, 1661, 1685 and at various other dates during the seventeenth and eighteenth centuries[15]. The vast revenue from the trade went hand in hand with a high level of regulation. For example, from 1624 until 1638 London was the only port permitted to

import tobacco, and even after this the number of ports dealing in tobacco was closely restricted[16]. Tobacco other than the English colonial product and some Spanish was forbidden, and the Spanish was discouraged by punitive duties[17]. An allowance for duties paid could be claimed back on tobacco which had become damaged, so long as it was returned to the Customs officers to be destroyed[18]. This resulted in a regular downstream traffic on the Severn in 'returned tobacco'. There were many more regulations governing things like the manner in which tobacco could be shipped and who might sell it: from 1700 tobacco could be imported only in containers containing over 200 lbs each, and no longer 'in bulk'[19], and retailers of tobacco were required to have licences from 1633[20].

Although tobacco had greater importance as a commodity of international trade than of internal trade, it did have considerable significance in the domestic market. Reliable estimates of tobacco consumption in England are difficult to find, since smuggling and customs fraud were so extensive. It is probable that consumption of tobacco in the seventeenth and eighteenth centuries greatly exceeded that which was apparent. Recorded retained imports fluctuated considerably: in 1694 it was estimated that about 5,000,000 lbs were annually consumed in England[21], but at the beginning of the eighteenth century the figure was over 11,000,000 lbs. It fell to around 5-7,000,000 in the 1730s and 1740s, but rose again to nearly 11,000,000 by the early 1760s. These variations were probably partly the result of genuine changes in the market, but they are also regarded as reflecting variations in the level of Customs evasion in response to changing retail prices and duties[22]. In the 1720s, for instance, revenue officials believed that nearly 1,700,000 lbs of tobacco a year were being smuggled (see the discussion of smuggling below)[23]. Tobacco consumption in England in the seventeenth and eighteenth centuries, therefore, was undoubtedly large, and it may have been larger than official figures suggest.

Considering that this lucrative trade developed out of nothing from the late sixteenth century, tobacco must be regarded as an important new consumer good and one index of the so-called 'consumer revolution'. Though tobacco was ascribed some important medicinal values, particularly in warding off plague and other contagions[24], it was essentially a luxury good in the sense that it was new, it was not a necessity, and it was relatively expensive. But it was a luxury which was exceedingly widespread. It was said even as early as 1614, 'there is not so base a groom that coming into an alehouse to call for his pot, but he must have his pipe of tobacco'[25]. According to Spufford,

'Cheap tobacco... was one of the goods created for the humble consumer society of the eighteenth century'[26].

The new internal trade in tobacco had important implications for retailers in England. Willan suggests the growing consumption of expensive imports, tobacco among them, as one of the reasons for the increase in the number of provincial shops in the period[27]. From 1632 tobacconists had to be licensed, in an effort to control the trade, and were able to sell tobacco officially only in sealed packets. Over 2,000 dealers in tobacco were licensed, who were primarily specialist tobacconists or mercers; however there were many hundreds of unlicensed retailers, including innkeepers and pedlars[28]. Tobacco was a commodity for which the retail margin was high: a grocer of Lancaster in the 1680s could charge a 200% margin on his tobacco compared with only a 33% margin on prunes[29]. This was partly because it was a commodity which was frequently further processed by the retailer. The probate inventories of many mercers, grocers and tobacconists contain tobacco at various stages in processing: in roll and leaf, and cut, as well as tobacco dust and stalks (Table 6.1). Such inventories frequently also contain equipment such as 'tobacco knives', or in a typical case 'a tobacco press, knives, sieves, cutting board hamer and killer' valued at £3[30]. The main processes were concerned with turning leaves into cut tobacco ready to smoke in a pipe. The tobacco was unpacked from the hogsheads, in which it had usually been tightly compressed, and parts damaged in transit were cut away. Shipments of damaged tobacco appear regularly in the Port Books returning to Bristol so that they could be destroyed and some of the duty paid reclaimed[31]. The bunches of leaves or 'hands' were moistened and separated from one another and their stems pulled out if they had not been before. The stems had a much lower value but were sometimes ground into snuff or even smoked, and there was a small trade in stems and dust on the Severn. The leaves were laid and compressed into flat cakes which were cut by knives or by a guillotine operating over a table which gradually moved the cake forward, allowing fine slices to be removed. Some of the most important distinctions in the quality of tobacco regarded the fineness of the cut[32].

In much the same way that salt was a staple commodity of downstream trade on the Severn for much of the period studied, so was tobacco of upstream trade. The Severn was a corridor for diffusion and distribution as well as for funnelling and direction. The large area within reach of the river was a considerable market for many consumer goods, and tobacco, amongst many others, could readily be supplied from the Port of Bristol. Bristol was the second largest port in the tobacco trade throughout the seventeenth century, after London, which was always predominant. In 1670, of the 6,000 tons of shipping owned at Bristol, half was said to be in the tobacco trade[33], and in 1700, nearly 50% of the vessels entering Bristol from overseas were from

Table 6.1

Tobacco in probate inventories of shopkeepers and chapmen

Date	Place	Types	Value d	Quantity lbs	Price d/lb	Total Stock lbs
1624	Chester	roll	624	13	48	
		roll	1296	18	72	
		---	864	9	96	
		roll	192	8	24	
		---	144	4	36	
		---	1200	10	120	62
1643	Worcester	---	117	6.5	18	6.5
1673	Norwich	Span roll	572	22	26	
		Span cut	200	5	40	
		cut	420	30	14	
		ord cut	352	32	11	
		ord cut	324	36	9	
		cut stalks	30	14	2	
		leaf	896	112	8	
		leaf	2688	336	8	
		leaf	2100	224	9	
		leaf	210	28	8	
		leaf	448	56	8	
		ordinary	756	84	9	
		middle	600	50	12	
		best	60	4	15	1033
1694	Monts	sealed	52	4	13	
		roll	472	63	7	
		cut	352	44	8	111
1696	Staffs	---	1136	71	16	
		ordinary	66	6	11	
		---	32	3.5	9	80.5
1702	Staffs	best	80	5	16	
		---	60	6	10	11
1707	Stafford	dust	120	40	3	
		middle	276	28	10	
		ordinary	444	56	8	124
1716	Cheshire	best	126	7	18	
		second	117	9	13	
		coarse	153	17	9	33
1721	Salop	---	876	73	12	
		---	1380	138	10	
		---	891	99	9	
		---	462	42	11	
		dam. stems	202	101	2	
		stems	188	47	4	500
1728	Derbs	---	263	34	8	
		---	480	30	16	
		---	1030	103	10	
		---	36	3	12	170
1730	Norfolk	---	324	36	9	36

Sources:
Spufford, 'Great reclothing', pp. 197, 206.
Portbooks Programme inventories, pers. comm. Nancy Cox

North America or the West Indies. Indeed this was one of the factors that helped to make Bristol the second largest port in the country during the later seventeenth and early eighteenth centuries. As late as 1722 Bristol was the port of arrival for 14% of England's imported tobacco, although its trade became stagnant in comparison with other ports in the next decade and its share dropped quickly[34]. Liverpool, Whitehaven and other ports began to overtake it from the 1730s[35].

Bristol was the obvious and most accessible source of tobacco for the Severn valley and its hinterland. However it should be remembered that other sources of tobacco were not far from the river. Liverpool and Whitehaven were accessible overland from Chester, which was only 42 miles by road from Shrewsbury, and tobacco could also come overland from London. Ports other than Bristol in the Bristol Channel or close to it were also involved in the tobacco trade. Bideford, Barnstaple and Exeter were all important tobacco importers in the early eighteenth century[36].

Also, the Severn Valley was without doubt the leading region in the country for the production of home grown tobacco until the 1690s. It was first grown as a field crop at Winchcombe in 1619, but growing in England was banned from December of that year. It is impossible to say exactly how much was grown in Gloucestershire, Worcestershire and adjoining counties in this period, as the crop was often furtively cultivated, and there are no records of its distribution. However it was enough to be regarded by the government as a serious threat to Customs revenues throughout the period from the 1630s to the 1670s, and the product seems to have been traded widely[37]. *The profit in the early seventeenth century was enormous: it* could be as much as £100 per acre for a good crop compared with a profit for most arable farms of perhaps 10s.[38]. It was grown successfully in the Vales of Tewkesbury and Evesham, first by merchant entrepreneurs and then by the peasantry of the area, and even with falling tobacco prices, profits were still high in the 1650s and '60s. The product was usually mixed with other tobaccos and passed off as the pure variety, to be sold locally, in London, in Ireland and the Low Countries. In 1665 it was reported to be in cultivation in 14 counties, most of which were within the larger hinterland of the Severn, and in the following year was still spreading[39]. The decline in tobacco prices in the later seventeenth century seems to have brought about a sharp fall in English cultivation in the 1680s. The last known reference to growing in Gloucestershire, which had always been the heart of the trade, was in 1697[40].

The trade in tobacco on the Severn is an example of one of the river's most important high-value trades. Obviously, the economics of carrying tobacco were quite different from those for a commodity like salt, and one would expect entirely different patterns

of carriage. Towards the end of the seventeenth century the wholesale value of tobacco was something like twenty times that of salt by weight, and it had, as has been said, an exceptionally wide profit margin, retailing for about three times as much again[41]. Tobacco rose from a trade so slight as to be unmentioned in the Port Books in the early 1600s to become one of the most frequent upstream commodities by the end of the century. From the 1680s until the decline in the quality of the Port Books in the 1720s, it was recorded on around 50% of all upstream voyages.

Tobacco was described in various ways in the Port Books. Fifteen terms were searched for in this study. Although by far the most common term was simply 'tobacco' itself, some of the others do shed light on the varieties of tobacco available. Several terms were related to the places of origin of the tobacco: namely 'Barbados tobacco', 'Spanish tobacco', and 'Virginia' tobacco of various types. The condition or extent of processing of the tobacco was also denoted on occasion. 'Bulk tobacco' was that carried without individual containers, 'leaf', 'roll', 'twist' and 'cut' tobacco were types processed to different stages, and 'damnified' or 'decayed' tobacco had been damaged or had begun to rot[42]. A large number of terms also existed for the remains of the tobacco leaves after they had been processed, which were recycled for grinding into snuff. These have not been searched for, in order to avoid distorting the picture to be obtained of the trade in tobacco itself[43].

A quantitative analysis which separates the different types of tobacco available is, unfortunately, impossible for most of the sample years, when the term used in the Port Books was simply 'tobacco'. It was only in the unusually full book for 1656, discussed in Chapter 1, that distinctions between different types of tobacco were made regularly. These have been converted approximately to lbs in Table 6.2 so that comparisons can be drawn.

Table 6.2

Types of tobacco carried upstream in 1656

Barbados tobacco (rolls)	180 lb
Cut tobacco	2240 lb
Tobacco	3807 lb
Virginia cut tobacco	920 lb
Virginia roll tobacco	672 lb
Virginia tobacco	16076 lb
TOTAL	*23895 lb*

Of the tobacco carried in 1656, therefore, nearly three-quarters was identified specifically as from Virginia, less than 1% was said to be from the West Indies, and the remaining quarter was unidentified. It is notable that no Spanish tobacco at all features in the trade at this time. The tobacco duties had already penalised Spanish tobacco since 1631, placing on it a duty more than twice that on Virginia tobacco, and this differential was greatly increased in 1656 itself such that Spanish tobacco was charged 12 times more[44]. By later 1656, in fact, England was at war with Spain, and this must have affected imports heavily. The evidence from the Port Books may suggest that this strategy was already effective in the inland market of the Severn Valley already. Certainly by 1686 it was working effectively, for Bristol even in that year of peace imported only eight barrels of tobacco from Spain and Portugal[45].

It is clear that some of the tobacco in 1656 was cut before it was shipped up the river. It is possible to judge whether the tobacco was in rolls or cut in the case of just 4,012 lbs, or a sixth of that carried. More than three quarters was ready-cut. In 1647, on the other hand, the one shipment made upstream had consisted entirely of Barbados tobacco in rolls. Unfortunately it is impossible to extrapolate over the rest of the tobacco carried in 1656, as the vast majority was in an unknown state. However it is at least clear that tobacco was shipped in both forms up the river, so that a considerable proportion must have been taken ready-cut by retailers in addition to that which it is known from probate inventories they cut themselves[46].

All the figures for the quantities of tobacco shipped coastally through the Port of Gloucester which are discussed below have been calculated in the most common unit of measurement, the pound weight (lb). Where the lb was not the stated measure, that given has been converted according to the best estimates available of their weight equivalents. By and large conversion in this way does not present any serious danger of error, for several reasons. First, the weight was stated in the Port Books of every upstream shipment bar one in all the sample years from 1697. Second, many of the more difficult units to translate into weight, such as the roll or the truss, appear only once or twice in the sample years even before 1697. Finally, there is some internal evidence from the Port Books as to the weight equivalent of measures used[47].

Conversion in this way does however have some dangers. The most important arises from the difficulty of converting the hogshead of tobacco into pounds weight. The hogshead was used to define virtually all the upstream shipments in 1674 and small but potentially significant proportions in 1656 and 1684. It was also by far the predominant measure in the small downstream trade in returned tobacco. The conversion of the hogshead used here assumes it contained around 350 lb on average,

and is based on the internal evidence of the Port Books in 1684. It is clear that the contents of hogsheads varied considerably in weight for inland use, and any conversion must derive from an average of real practice rather than a true standard[48]. Other evidence suggests clearly that in the import trade and in later times the hogshead was considerably larger[49]. Alternative calculations are discussed in the text where they are of material significance.

It should also be remembered when examining the figures that the effects of smuggling and customs frauds in reducing the figures for imports of tobacco may have been very significant in some cases. As a low-bulk commodity with a high price and a high duty, the incentive to smuggle tobacco was great. Duties were imposed in the sixteenth century, but were raised by an extraordinary leap under James I from 2d to 7s per lb[50]. By 1640, according to Williams, 'tobacco had become the staple of the smugglers' import trade'[51]. Customs evasion might be committed not only by the 'conventional' smuggler, landing a small boat under nightfall, but also by leading tobacco merchants, perhaps with complicity of customs officers. There was a huge variety of methods used, including re-exporting to claim the draw-back of duty and then smuggling back from somewhere nearby, claiming to have re-exported more than was sent, and loading hogsheads of vastly different weights, as well as plain bribery and corruption[52]. In the five years from 1739 the recorded imports of tobacco to Whitehaven were consistently less than the exports by an average of 10%[53]. At Bristol, the customs officers, in Williams's phrase, were 'up to their necks in frauds, taking bribes quite openly and falsifying their accounts'[54].

Unfortunately it is extremely difficult to estimate the extent of fraud affecting the tobacco trade. It seems clear that evasion was less in the seventeenth century than the eighteenth, which saw the 'profession' of smuggling reach its heyday[55]. It fluctuated during the eighteenth century in accordance with variations in retail price and the rate of duty. Cole's investigations of tea smuggling in the period may well indicate broad phases which applied to tobacco also: he suggested that there was a peak of evasion in the 1740s, after which smuggling fell back somewhat until the mid 1760s when it began to rise again[56]. He estimated that in the early 1740s at least 2 million lbs of imported tea a year evaded recording, some two or three times the volume of legal sales in England[57]. In the 1720s revenue officials believed nearly 1,700,000 lbs of tobacco a year were smuggled, compared with imports of about 30,000,000 lbs[58]. Virtually all this smuggled tobacco would have been retained for English consumption, which in the 1720s was recorded at some 7-13,000,000 lbs[59]. Actual tobacco consumption in England was therefore at the least 13% higher than stated figures, and in many years much greater.

It is difficult to say how far customs evasion would have affected the reliability of figures for shipments on the Severn. The customs system was presumably worth keeping well away from as far as many smugglers were concerned, and they would not have wished to have even coastal records of their activities However as coastal trade in tobacco was not subject to duty, the coastal Port Books system may not have caused smugglers much concern. Indeed, once the fraudulent assistance of the Bristol customers had been bought, it would be foolish and largely unnecessary to attract attention by acting furtively at Gloucester. The coastal Port Books can therefore probably be regarded as a rather more accurate measure of tobacco consumption than those for overseas trade, even though they must have been subject to some abuse. It seems unlikely, however, that they would have recorded a substantial proportion of any of England's home-grown tobacco. Since the customs officers were charged with the responsibility of trying to prevent tobacco growing in England[60], they would have been heartily left alone by most merchants of tobacco grown illegally in Gloucestershire and other Severn-side counties, especially as the downstream trade in tobacco through Gloucester was unusual and therefore noteworthy. It must, though, be accepted that the statistics of tobacco recorded in the Gloucester coastal Port Books if more accurate than the overseas ones are largely illustrative of the consumption of tobacco and not exact. However, they do represent a minimum.

ii. The volume of trade

The total volume and direction of the trade in tobacco through Gloucester in general forms the clear pattern that would be expected. In most of the sample years there was a simple pattern of the dispersal of large quantities of tobacco upstream from Bristol, combined with the return of much smaller amounts downstream. However other themes are also suggested, including the rapid growth of tobacco consumption in the region, and the difficulties of maintaining a regular supply (Table 6.3).

No tobacco at all was recorded passing upstream in 1637. This indicates that the tobacco trade of the Severn was unimportant at the time, though there are some doubts about the comprehensiveness of pre-Civil War Port Books. Probably none was carried on the river at all, but a small quantity may have been grouped with goods such as 'grocery'. It would be expected at this time that the vast majority of tobacco for the Severn valley region should be coming from London overland. The importation of tobacco via any of the outports was still illegal in 1637[61], and tobacco certainly came from London to Bewdley at a later date[62]. Bristol merchants resented

Table 6.3

Recorded shipments of tobacco upstream, all sample years

	Voyages	lbs	Mean shipment
1637	0	0	0
1647	1	1340	1340
1656	45	23895	531
1666	0	0	0
1674	39	144096	3695
1684	150	666107	4441
1697	117	654005	5590
1699	145	849876	5861
1704	116	623753	5377
1705	111	490034	4415
1706	122	526071	4312
1707	126	593631	4711
1708	147	776050	5279
1715	106	423827	3998
1722	134	811736	6058
1733	22	48034	2183
1741	7	36995	5285
1752	7	8777	1254
1765	5	7128	1426

the reservation of the trade to London, and did import tobacco on a small scale: for example a cargo of tobacco from St. Kitts was permitted to land at Bristol in 1637, and 324 lbs of tobacco had come into the port in 1613[63]. The restriction was ended in 1638, when Plymouth, Bristol, Dartmouth and Southampton as well as London were given the privilege of importing tobacco[64]. In 1647 a single tobacco shipment, of perhaps 1,340 lbs, was recorded passing up-river, suggesting that the tobacco trade was still not large and still centred substantially on London, perhaps partly as a result of the great damage to the trade of Bristol caused by the Civil War, which had brought two sieges and great disturbance to the city's inland trade, and the impact of heavy taxes[65].

By 1656 trade upstream in tobacco had grown markedly to 23,895 lbs carried on 45 voyages, though this high figure may have been created partly by the seemingly more diligent recording of that year (see Chapter 1). The tobacco trade of the river was obviously now of some importance, and Bristol was again prospering after its set backs[66]. Even so, its significance was still slight compared with later years. Tobacco was carried on only 14% of all the upstream voyages in 1656 compared with over half in most later years, and the mean shipment size was only 531 lbs, less than an eighth of mean shipments half a century later.

After this growth in trade, it is surprising to find that no tobacco at all was recorded passing upstream in 1666. This almost certainly resulted from several factors connected with supply. The previous few years had been disastrous ones economically for the American plantations as a glut of production brought down prices. By 1663 the situation had become so serious that new planting was forbidden, and further agreements not to plant were made in 1666 and the following two years. Although these were not considered to have been particularly effective, they may have had some influence on the supply of tobacco to England[67]. Perhaps a more important factor, though, was that trade conditions were worsened further in 1665 owing to the Plague: no fleet was permitted to sail from Virginia in that year, with the result that the price of Virginia leaf nearly doubled[68].

Yet another factor may have been that the Anglo-Dutch War of 1664-7 was impeding trade. Whereas this may have accounted for a boom in the downstream salt trade of the period, a boom could not have been created in tobacco shipments. With the press out in Bristol, the chief centre for collecting tobacco, and with the Dutch and French interfering with trade, tobacco supply up the river must have been affected[69]. In 1665 the Dutch captured five 'rich and considerable ships' belonging to Bristol merchants and laden with Virginia tobacco. Although 18 ships arrived from Virginia in July 1666, the loss in the previous year must have had continuing effects for much

of the rest of the year[70]. If this had been the only influence impeding the tobacco trade, surely some would still have infiltrated the Severn valley, but on top of the disturbances to growing in America it may have been enough to kill the trade dead for a time. The evidence of trade does suggest that difficulties of importing may have been particularly great at Bristol, since in the same year an exceptionally large amount of tobacco was shipped downstream to Bristol (see below).

By 1674, the upstream tobacco trade had made a considerable leap in scale compared with the mid 1650s. In that year 39 voyages carried a total of about 144,096 lbs (or 201,696 lbs if a larger hogshead is assumed)[71]. Mean shipment size had grown several fold since 1656 and 30% of recorded upstream voyages now carried tobacco. The later leap was greater still, however, and it is possible that in 1674 the tobacco trade was being somewhat restricted by the third Anglo-Dutch War, which came to an end only in 1674 itself. England's overseas trade as a whole increased by more than a third in value by the mid 1680s compared with the early 1660s, partly as a result of the newly peaceful conditions, and this seems to have been reflected in the tobacco trade of the Severn[72].

By peacetime in 1684 there had been a huge leap in the recorded tobacco carried upstream, both in terms of its total weight and the number of voyages involved. In that year 666,107 lbs[73] were carried upstream on 150 voyages or 57% of all recorded upstream sailings. A similar volume of trade was maintained in 1697, though on rather fewer voyages, despite the recorded depression during the war of the League of Augsberg[74]. This is an impressive volume of trade given the damage done during the war, which included the loss of some 4,000 English ships[75].

With peace, upstream tobacco shipments seem to have been able to increase once again: by 1699 reaching a peak in all the sample years studied of 849,876 lbs. The mean shipment size, too, was greater in this year than any that preceded it, although the number of voyages, at 145, was slightly below that in 1684 when the trade was becoming properly widespread. The great advance of the tobacco trade in this year over others studied before and after seems to show the extreme susceptibility of the trade to war and other conditions of difficulty in overseas trade. 1699 and 1722 stand clearly above other sampled years in the volume of their tobacco trade: and these were the years most free from disturbances.

From 1704 to 1708 the level of trade in tobacco upstream was much lower, although it varied from year to year. It seems that the War of Spanish Succession was having an important deleterious effect. The years 1704-8 were recognised as a period of lower trade in general[76]. Tobacco ships were particularly liable to be taken by privateers, and there were many complaints of this during the war[77]. Even so, it was

said in 1706 that 300 tobacco ships had left Virginia and Maryland, and these were 'a far greater number than ever went from these provinces before'. A greater proportion of this tobacco probably went to Liverpool, Glasgow, and other ports further north encouraged, according to Davis, by the existence of privateers in more southerly waters[78]. Either the greater number of ships was not matched by the greater amount of tobacco they carried or else many were lost in transit, since there was no enormous effect on imports to England, which were recorded even in the less disturbed period 1709-10 as only a little higher than 1697-8[79].

International peace does not seem to have been the sole prerequisite of healthy trade. The figure for shipments upstream in 1715 was lower than any in 1704-8 at 423,827 lbs or 30% below the mean for the five years. This may perhaps have been connected with disturbances from the Jacobite Rebellion in that year, although it is difficult to explain wholly by such factors external to the tobacco trade itself, given that total imports of goods to England and Wales were not much reduced in 1715 compared with those adjacent to it[80]. Returns of tobacco downstream were remarkably stable in that year, but it is possible that the purchasing power of many smokers was materially affected by the political disturbances of the time: the price of wheat in 1715 was higher than it had been since the peace and than it would be for another ten years; and the price of malt was higher in 1715 than in any other year from 1712 to 1763[81]. Also, this was the year in which Liverpool's first wet dock was opened. It seems unlikely this would have had such an immediate effect in abstracting trade from Bristol, but Defoe was making much of the rivalry of the two ports within a few years of it[82].

In 1722 the quantity of tobacco shipped upstream was highest of all the sample years save 1699 alone, at 811,736 lbs. Though the mean shipment size had grown to 6,058 lbs, higher even than in 1699, comparing these two years of peacetime suggest that the tobacco trade up the river had ceased to grow at such a pace. This may have been for several reasons: possibly the amount of evasion of the customs had increased as England entered what Williams called 'the heyday of illicit trade' from about 1713 to about 1775[83]. Perhaps consumption was reaching a plateau for a time, since tobacco imports were only a little higher around 1723 than they had been around 1700[84]. Yet again, the reason for the failure to grow may have been that increasing demand was being supplied through Liverpool and other ports which were fast catching up with Bristol in this period. In 1722 Bristol was recorded as having imported 43% of national retained tobacco imports by weight, but in 1731 that figure was reduced to 23%: whereas retained tobacco imports nationally had almost doubled, those at Bristol had fallen slightly[85]. Nevertheless, if the figures for imports are to be believed, Bristol's

retained tobacco imports in 1722 were 2,949,349 lbs, and over a quarter this quantity was still shipped upstream through Gloucester.

Unfortunately, the Port Books can shed no further light on this matter as it is clear that the reliability of the figures for tobacco shipments upstream declines rapidly from the 1720s. The number of voyages recorded carrying tobacco upstream fell from 134 in 1722 to only 22 in 1733, then again to just seven in both 1741/2 and 1752 and five in 1765. Clearly, the tobacco that continued to be recorded was a gross undervaluation compared with the total that must have been carried. Whatever the decline of Bristol as a centre for tobacco dealing, it is absurd to think that Gloucester could have received coastally only 7-8,000 lbs of tobacco per year in the 1750s and 1760s. Willan's assumptions that the tobacco trade declined in the eighteenth century clearly are unsupportable. He based his conclusions on simple comparisons of figures for around the 1680s and the 1730s at Great Yarmouth, King's Lynn and Gloucester[86]. His reliance on so few sample years concealed the decline in the records that is so obvious when a longer study is made.

Owing to the difficulties caused by smuggling, it is hazardous to attempt to compare figures for English imports of tobacco with the amount recorded passing up the Severn. Such comparisons may have some use, however. According to the Wharfage Book of the Society of Merchant Venturers of Bristol, the port imported from November 1654 to October 1655 the equivalent, roughly converted, of about 1,853,060 lbs[87]. It is unknown how much of this tobacco would have been retained, but that recorded being shipped upstream in 1656 was only just over 1% of the total. By 1671 Bristol's total imports were 2,450,560 lbs[88], compared with shipments upstream of 144,096 lbs three year later. Nearly 6% of all initial imports were therefore now finding their way upstream. In 1722, Bristol's recorded imports were 4,109,182 lbs and trade recorded up the Severn stood at 811,736 lbs or nearly 20% of the total[89]. The share of Bristol's total retained and re-exported trade which was consumed in the Severn valley and its hinterland seems therefore to have been growing, perhaps reflecting that at this time it was gaining slightly in the domestic market but it was now losing out in the total tobacco trade to ports like Liverpool, Whitehaven, Glasgow and others.

1722 is the only sample year for which it is possible to calculate roughly the proportion of Bristol's retained, as opposed to total, imports which were traded up the Severn corridor by river. Retained imports recorded in that year were 2,949,349 lbs, of which Gloucester took only around 27%. This seems plausible given the large market lying closer to Bristol, and the fact that by this time upper parts of the Severn region must have been receiving tobacco also from Liverpool as well as London[90].

As far as national consumption was concerned, it appears that at the end of the seventeenth century, England consumed at home some 13,000,000 lbs of tobacco[91]. The quantity recorded going up the Severn in 1699 represented nearly 7% of this. Even in a luxury good of high value and low bulk, then, the Severn was a significant carrier in the national context.

At first examination, the downstream trade in tobacco through Gloucester does not seem worthy of detailed examination. The quantities shipped were minuscule by comparison with those coming up, and most of the shipments were of 'returned tobacco' which had been damaged. In fact, however, the downstream tobacco trade sheds some important sidelights upon the trade in general. The totals of tobacco carried downstream are listed in Table 6.4. Unlike the other tables, this lists quantities shipped in terms of their specified measures instead of their equivalent in lbs. The weight is almost never given in the original documents for downstream trade, and producing totals would put undue stress on the accuracy of conversions. Containers in the tobacco trade were never standard, and it is likely that in the downstream trade of mainly damaged tobacco the meaning of a unit like the hogshead showed even greater variety. However, a column of conversions to lbs has been included to allow rough comparisons to be made, based on the same assumptions as for upstream trade discussed above. Stalks, tobacco dust and other bi-products of tobacco processing are not discussed here.

There is a valuable contrast between the upstream and the downstream figures even in the first sample year. In 1637 whereas no tobacco was shipped upstream owing to the reservation of the trade to London, two hogsheads or perhaps 700 lbs were sent downstream to Bristol. This was most probably being supplied to Bristol by a circuitous overland route from London to Gloucester and thence by river. There is nothing to indicate it was damaged tobacco being returned, and if it had been it would probably have gone back to London, not Bristol. In 1647 about half as much tobacco was shipped downstream as up: indicating that Bristol was still receiving tobacco from indirect sources. It is just possible that in both years the tobacco going downstream was grown in Gloucestershire, but this seems unlikely given the dangers of discovery by the customs officers.

1666 was the *annus mirabilis* of the downstream tobacco trade. Several large cargoes were carried to Bristol, amounting to 138 hogsheads or perhaps nearly 50,000 lbs. None of this was stated to have been returned. Since this was a year in which no upstream trade in tobacco at all was recorded it seems clear that a sizable part of Bristol's needs were being satisfied from upstream. Some of the possible reasons for

Table 6.4

Recorded shipments of tobacco downstream, all sample years

	Home	To		Unit	lbs	Returned or other information
1637	GLC	BRS	2	HHD	700	
1647	GLC	BRS	1	BRL	261	
			2	PACK	480	
				Total	741	
1666	BWD	BRS	49	HHD	17150	
	WRC	BRS	3	HHD	105	
	UPT	BRS	54	HHD	18900	
	TWK	BRS	32	HHD	11200	
				Total	48300	
1674	SLP	BRS	1	HHD	350	R
	BWD	BRS	1	HHD	350	R
	TWK	BRS	2	HHD	700	R
	TWK	BRS	5	CWT	560	R
				Total	1960	
1684	BWD	BRS	2	CASK	448	
	BWD	BRS	1	HHD	350	
	WRC	BRS	6	HHD	2275	R
	WRC	BRS	3	KK	390	R
	TWK	BRS	1	HHD	35	R
	GLC	BRS	1	BRL	261	
				Total	4074	
1697	SLP	BRS	3	HHD	105	
	BRI	BRS	1	BRL	261	R
	BWD	BRS	1	HHD	350	R
	BWD	BRS	6	BOX	2016	R
	FVS	BRS	1	BRL	261	R
	TWK	BRS	1	BAG	336	
	GLC	BRS	1	HHD	35	R
	GLC	BRS	2	KK	260	R
	GLC	BRS	10	BAG&	3360	
	GL	BRS	8	HHD	2800	
	GLC	BRS	3748	LB	3748	
	LND	WY	6778	LB	6778	
				Total	21570	
1699	LP	BRS	2	HHD	700	R
	BWD	BR	3	HHD	105	R
	BWD	BRS	1	BSKT	336	R
	BWD	BRS	1	BOX	336	R
	TWK	BRS	1	HHD	350	R
	GLC	BRS	1	HHD	350	R
				Total	3122	
1 [illegible]	SLP	BRS	1	KK	13	R
		BR	1	HHD	35	R
	BWD	BRS		HHD	175	R
	BWD	BRW	1	HHD	35	Per certificate from London dated
	WR	BR	1	HHD	35	R Came per coquet dated 23/06/1
	TWK	BRS	2	CASK	448	R
	RDB	BRS	10212	LB	10212	Per certificate from Liverpool in th
				Total	13590	
1705	SLP	BRS	9	HHD	3150	R
	BRI	CHP	1	HHD	350	by coquet from Liverpool 22/02 las
	BRI	CHP	19	HHD	6650	from Liverpool per certificate
	BWD	BRW	1	HHD	350	Came from London by way of trad
	WRC	BRS	2	HHD	700	R
				Total	11200	
1706	BWD	BRS	1	HHD	350	R
	BWD	BRW	2	HHD	700	Part of 3 hhds came per land carria
	BWD	BRW	1	HHD	350	Per certificate from London
	WRC	BRS	6	HHD	2100	R
	WRC	BRS	2	HHD	700	
	WRC	BRS	2	BRL	522	
				Total	4722	
1707	SLP	BRS	1	HHD	350	R
	BWD	BRS	1	HHD	350	R
	BWD	BRW	3	HHD	1050	R
	TWK	BRS	2	HHD	700	R
	WRC	BRS	1	BAG	336	R
	WRC	BRS	5	HHD	1750	R
				Total	4536	
1708	SLP	BRS	2	HHD	700	R
	WRC	BRS	1	HHD	350	R
	WRC	BRS	1	BOX	336	R
	TWK	BRS	2	HHD	700	R
	GLC	BRS	1	HHD	350	R
				Total	2436	
1715	BWD	BRS	3	CASK	224	R
	WRC	BRS	1	HHD	350	R
	WRC	BRS	1	BOX	336	R
	GLC	BRS	25	HHD	875	R
	GLC	BRS	1	TRUSS	56	R
	GLC	BRS	4	BOX	1344	R
				Total	3185	
1722	BRO	BRS	2	HHD	700	R
	BWD	BRS	1	HHD	350	R
	BWD	BRS	1	BOX	336	R
	WRC	BRS	1	HHD	350	
	TWK	BRS	2	HHD	700	R
	GLC	BRS	1	BOX	336	R
	GLC	BRS	1	BAG	336	R
	GLC	BRS	1	CASK	224	R
				Total	3332	
1733	---	BRS	1	BAG	336	R
	---	BRS	7	HHD	2450	
	-	BRS	1	BOX	336	
		CHP	2	BAG	672	
		CHP	3	BRL	783	
				Total	4577	
1741		BRS	2	BOX	672	
		BRS	728	LB	728	
				Total	1400	
1752	nil					
1765	nil					

the lack of upstream trade have already been discussed. These were the fall in shipments from Virginia owing to the tobacco growing moratorium and fear of the Plague, and the possible avoidance of Bristol as a port owing to the dangers of privateers in the English and St George's channels. The presence of downstream trade in tobacco at a time when none at all was coming up gives added credence to all these influences in disrupting the tobacco trade. However it gives particular emphasis to the dangers from the privateers. Much of the tobacco coming downstream must have been coming from Liverpool or other northern ports not affected so much as London and Bristol were by the war. Given the dangers of the Plague and the added disruption of the Great Fire at London in 1666, it seems unlikely that tobacco from there was a large proportion of this downstream trade. Some of the tobacco may, however, have been grown in the Severn valley, presuming that traders were willing to run the gauntlet of the Customs with their illegal crop. 1666 was certainly a busy year for tobacco growing in Gloucestershire and elsewhere in the Severn valley, with 'a much greater quantity than in former years' reported to be growing[92], and there were serious riots when the militia was sent in in an attempt to destroy the crop[93]. With the price of Virginia leaf rising in 1665 from four and a half to eight pence per lb, owing to the difficulties of supply, there would have been great temptation to attempt selling home grown tobacco in Bristol. Unfortunately, it is impossible to be sure of the true origins of the downstream tobacco in 1666. Given the difficulties of the time, it seems likely that it was both home-grown and imported through northern ports.

In 1674 and in 1684 the downstream tobacco trade was a fraction of its extent in 1666. It seems that by this time it was no longer in tobacco for sale in normal circumstances, but was damaged tobacco returned to be destroyed by the Customs officers. In 1674 all the tobacco shipped downstream was said to be 'returned', and in 1684 nearly all was specifically described as such and the remainder was in small shipments which were probably the same. In peacetime, it seems that Bristol had now become the proper supplier of the Severn valley (or at least its lower part), and there is no intimation of home-grown tobacco being shipped, the cultivation of which was rapidly becoming less popular by this time.

In wartime again, in 1697, the downstream tobacco trade was once again active. The volume shipped downstream was perhaps four times what it had been in 1684, and only about one fifth of it or less was specifically said to be 'returned'. This certainly must have been imported tobacco, since domestic tobacco cultivation had stopped by this date. Particularly large quantities were carried on boats of Salop and Gloucester, but Gloucester was far the larger of the two. This may indicate that some

tobacco was coming from Liverpool overland, but even more perhaps was reaching Gloucester from London. Strangely, though, one vessel, carrying 6,778 lbs, was a London vessel sailing from Gloucester to Weymouth. This may suggest that the most dangerous waters for trade were on the eastern parts of the south coast and some places normally supplied from London were disappointed. Bristol itself does not seem to have been badly affected, since its upstream trade in 1697 was only about a quarter less than in the exceptionally busy peacetime year of 1699.

1699 in fact saw a marked fall in downstream tobacco shipments, back to the level of 1684: a level that continued in all years sampled from 1706 to the decline in proper recording. In 1699 every single shipment was said to be 'returned' tobacco, and Bristol seems to have been dominating the Severn region more effectively than ever. When war started again, downstream shipments rose. In 1704 and 1705 about three times the normal quantity was shipped downstream, the difference being made by several large cargoes that were not returned tobacco, but brought from elsewhere. In these two years specific information is given in the Port Books to explain where this tobacco had come from. In the two years three hogsheads, or some 1,000 lbs or so, came overland from London to be shipped downstream on boats of Bewdley and Worcester; and a further 17,000 lbs or more came overland from Liverpool and down the Severn on boats connected with Bridgnorth[94].

From 1706 to 1708, the amount of tobacco carried downstream became much more stable, at around 4,500 lbs in 1706 and 1707 and around 2,500 in 1708. 1706 did see some tobacco which was not specified as 'returned' come downstream, from Bewdley and Worcester, and three hogsheads of this was said to have come by land carriage from London. By 1707 and 1708, however, all the downstream tobacco seems to have been 'returned', and there was none apparently coming overland from London or Liverpool. The greatest difficulties of wartime supply seem to have been overcome by now, as is also indicated by the relatively high figure for upstream tobacco shipments in 1708.

In 1715, 1722 and 1733 the amount of tobacco shipped downstream remained fairly constant at around the same level of a few thousand lbs. Not all the tobacco at this stage was specifically described as 'returned', but it seems likely, given the volume of traffic, that it was mainly of this sort. However the shipment of two barrels and two bags of tobacco to Chepstow in 1733 (containing perhaps about 1,500 lbs) suggests that some downstream trade could continue other than that in tobacco returning to Bristol for destruction. This may simply have been a consignment of tobacco which a merchant could not sell in the Severn valley and subsequently tried to sell in Chepstow.

It is interesting that the figure for tobacco shipped downstream in 1733 was of the same order as in previous years, suggesting that downstream tobacco shipments were being recorded as fully as before. This is in contrast to the figures for upstream shipments, which fell off markedly with the changes in recording between 1722 and 1733. After 1733, however, the downstream figures, too, fell markedly. Only about 1,400 lbs were recorded in 1741/2, none of which was said specifically to have been 'returned'. No tobacco at all was recorded passing downstream in 1752 or 1765.

iii. Geographical patterns of trade

The pattern of ports of origin for upstream shipments is extremely simple compared with other aspects of the tobacco trade. The dominance of Bristol as a centre of tobacco importation and marketing seems to have been almost total. Table 6.5 shows clearly that in most years Bristol was the only port of departure for voyages upstream to Gloucester carrying tobacco. The column in the tables labelled 'unknown' represents voyages for which the departure given in the Port Books was illegible or omitted. It is likely that in these cases too the port of departure was Bristol.

It is clear that there were other ports in the south-west of England which imported tobacco directly from the New World and could have sent it on to Gloucester. Even the Pembrokeshire ports, for instance, received some small shipments of tobacco from Virginia in 1680 and 1699, although they obtained most of their tobacco by coasting vessels from Bristol[95]. More significant is Bideford, which was said to have imported more tobacco than any other port in England except London for parts of the eighteenth century[96]. In the years 1722 to 1731 an average of 845,000 lbs of tobacco a year were landed at Bideford, and another 505,00 lbs at Barnstaple (as compared with over 4,000,000 lbs at Bristol). This tobacco was then shipped coastally to south Wales and to south coast ports like Plymouth, and was also traded overland[97], but it does not seem to have found its way upstream to Gloucester in any of the sample years. However, one shipment does appear in the Gloucester Port Books which was clearly of tobacco imported at Bideford: Samuel Pitt of Worcester in 1707 brought upstream from Bristol amidst a larger cargo of tobacco 1,600 lbs that were 'per coast coqt from Bideford'.

Bridgwater did not generally import tobacco or ship it coastally, but tended to receive it from Bristol[98]. However some tobacco imported there found its way upriver directly in 1699. Also, in 1706, William Perkes of Worcester brought from Bristol 715 lbs within a larger tobacco cargo which it was said had come 'coastwise from Bridgwater in name of Robert Martin' more than two and a half years earlier.

Tables 6.5 and 6.6

Recorded shipments of tobacco upstream, by port of departure (voyages and lbs)

	Bristol	Chepstow	Bridgwater	Ilfracombe	Unknown	Total
1637	0	0	0	0	0	0
1647	1	0	0	0	0	1
1656	45	0	0	0	0	45
1666	0	0	0	0	0	0
1674	39	0	0	0	0	39
1684	148	1	0	0	1	150
1697	117	0	0	0	0	117
1699	142	0	1	0	2	145
1704	115	0	0	0	1	116
1705	110	0	0	0	1	111
1706	121	0	0	0	1	122
1707	125	0	0	0	1	126
1708	142	0	0	2	3	147
1715	106	0	0	0	0	106
1722	134	0	0	0	0	134
1733	22	0	0	0	0	22
1741	7	0	0	0	0	7
1752	7	0	0	0	0	7
1765	5	0	0	0	0	5

lbs

	Bristol	Chepstow	Bridgwater	Ilfracombe	Unknown	Total
1637	0	0	0	0	0	0
1647	1340	0	0	0	0	1340
1656	23895	0	0	0	0	23895
1666	0	0	0	0	0	0
1674	144096	0	0	0	0	144096
1684	655494	6020	0	0	4593	666107
1697	654005	0	0	0	0	654005
1699	824196	0	20000	0	5680	849876
1704	622156	0	0	0	1597	623753
1705	485584	0	0	0	4450	490034
1706	506171	0	0	0	19900	526071
1707	592795	0	0	0	836	593631
1708	692462	0	0	82089	1499	776050
1715	423827	0	0	0	0	423827
1722	811736	0	0	0	0	811736
1733	48034	0	0	0	0	48034
1741	36995	0	0	0	0	36995
1752	8777	0	0	0	0	8777
1765	7128	0	0	0	0	7128

These examples show that tobacco must occasionally have found its way to Bristol merchants from other ports.

In all the sample years studied there were only four shipments of tobacco to Gloucester directly from ports other than Bristol (Table 6.6). In 1684 the *Robert* of Worcester, with William Jefferis merchant, came from Chepstow with 6,020 lbs amidst a cargo of herrings, grocery and strong waters. In 1699 the *William* of Bridgnorth, with William Alloway, who came from a large merchant family of the south-west[99], as merchant, brought 20,000 lbs from Bridgwater along with a large cargo of typical Bridgwater goods like serge and wool and also other imported goods like train oil, port wine, oranges and lemons. Finally, in 1708 two voyages from Ilfracombe brought 20,827 lbs and a vast 61,262 lbs with Andrew Carder merchant, on the *Success* of Upton and the *Endeavour* of Tewkesbury respectively.

It is striking that all of these cargoes from more distant origins came during periods of busy trade. 1684 was a time of considerable growth compared with earlier years, 1699 was of all the sample years the time when the trade was at a peak, unhampered by war, and 1708, although a year of war, was the third busiest of all those looked at. It seems that the opportunity for other ports in the south-west to take a portion of the trade only existed at times of great activity when demand was high and supplies may have been pressed. In the normal run of trade, Bristol's domination of the trade was absolute.

It is also surprising that the few cargoes of tobacco that did come from other ports were so large (Table 6.7). The one from Chepstow in 1684 was the least of them at nearly one and a half times the average for that year. That from Bridgwater in 1699 was over three times the average, and the larger from Ilfracombe in 1708 was nearly twelve times the average. It is clear from this that the cargoes could not possibly have been brought by merchants on the casual hope of being able to sell. Table 6.1 of tobacco in retailers's inventories suggest that even the largest tobacconists only stocked about 10,000 lbs and most shopkeepers probably stocked only a few hundred at the most. Cargoes like those from Ilfracombe in 1708, at over 40,000 lbs each, would have to rely on sales to dozens of different shops. Equally, it is clear that no single retailer could have been ordering the tobacco directly as the capital and risk involved would have been enormous except for a leading overseas merchant.

The most likely explanation of this is that in exceptional circumstances tobacco traders would group together to order tobacco from a different source than Bristol. This may have been the case in 1684 when William Jefferis, an established trowman, brought the tobacco and it was included within a cargo of other goods. At

Table 6.7

Mean shipment size of recorded upstream tobacco cargoes, by port of departure

	Bristol	Chepstow	Bridgwater	Ilfracombe	Unknown
1637	0	0	0	0	0
1647	1340	0	0	0	0
1656	531	0	0	0	0
1666	0	0	0	0	0
1674	3695	0	0	0	0
1684	4429	6020	0	0	4593
1697	5590	0	0	0	0
1699	5804	0	20000	0	2840
1704	5410	0	0	0	1597
1705	4414	0	0	0	4450
1706	4183	0	0	0	19900
1707	4742	0	0	0	836
1708	4876	0	0	41045	500
1715	3998	0	0	0	0
1722	6058	0	0	0	0
1733	2183	0	0	0	0
1741	5285	0	0	0	0
1752	1254	0	0	0	0
1765	1426	0	0	0	0

6,020 lbs this cargo may, perhaps, have been small enough to risk looking for a sale on arrival, but it was still a larger than average cargo for the period. In other cases, perhaps, a large tobacco merchant from one of the south-western ports would take orders in advance at Gloucester and above and send the tobacco in one large shipment when its sale could be guaranteed. Andrew Carder's two enormous shipments as merchant from Ilfracombe in 1708 were carried by two different established trowmen, from Upton and Tewkesbury, and they carried nothing else on board. Carder does not appear as a merchant in any of the other sample years for Gloucester, nor in the Ilfracombe, Bideford, Barnstaple or Bridgwater Port Books for 1699, and it seems likely he was a tobacco merchant at Ilfracombe or nearby with a large quantity to dispose of. However, the shipment of 20,000 lbs by William Alloway in 1699 may have been made in different circumstances. Alloway was a merchant based in Bridgwater who generally dealt in coastal and inland trade in English goods. This cargo with tobacco and other imported goods stands out from his more mundane shipments of cider and peas from Bridgwater in 1699 and suggest he may have come across a chance cargo[100]. Thus the few shipments upstream of tobacco from anywhere other than Bristol seem to have come about by diverse mechanisms, and were extremely rare. The regular supply of tobacco to the Severn valley was left to the better placed merchants of Bristol.

The study of the home ports of boats trading in tobacco presents many problems of interpretation. The extent of transshipment in many commodities seems to have been slight, but that in tobacco appears to have been large. Vessels which carried tobacco upstream may have been carrying it only a short way, from whence it was taken onwards by others. In some cases the journey of a consignment of tobacco may have been broken for some time while a sale was found for it and agreed; in other cases it may have been brought upstream speculatively. An example of the former is provided from a source other than the Port Books over two weeks in 1783, when Richard Wintle of Newnham sent some tobacco upstream on three successive trows: first to Gloucester, then from there to Worcester, then on again to Bewdley[101]. This shipment would have appeared in the Port Books simply as one to Gloucester, and its passage beyond would not have been revealed. This kind of irregularity of shipment, with some cargoes transshipped and some sent directly, may have created the great variation that is apparent in the amount of tobacco passing upstream to different ports. The involvement of different ports therefore seems somewhat chaotic. Nevertheless, some patterns do emerge.

Shrewsbury, the highest town on the river carried a large proportion of the tobacco traded upstream in most sample years. Salop boats did not carry any tobacco in 1647, when the entire quantity brought upstream through Gloucester was one shipment on a Broseley boat. However in 1656 and thereafter they carried tobacco on the majority of their upstream journeys (Table 6.8). In most sample years some 70% of upstream voyages of Salop boats carried tobacco, and in 1684 all of the eight voyages brought the commodity. Tobacco was a staple of the upstream traffic of Shrewsbury boats to a much higher extent than all other ports on the river except perhaps Gloucester: which reflects its great importance and prosperity as an urban market at this time. The mean shipment size on boats from the town was also high, and in most years second only to Worcester (Table 6.9). The result was that it was responsible for a high proportion of the tobacco trade on the river: about 11% in 1684, 25% in 1699 and 22% in 1704. From 1704, however, Shrewsbury's share in the trade fell dramatically, to only 10% in 1705 and only 5% in 1715. This may indicate that Shrewsbury was receiving an increasing share of its tobacco overland from more northerly ports, at least at first, due to the wartime difficulties. However it did not recover along with the tobacco trade of the river as a whole, indicating that the real cause was a decline in long-distance working of Shrewsbury boats and an increase in transshipment. After 1715, none of the sample years contained any upstream voyages at all on Shrewsbury boats.

The Severn Gorge ports seem to have been heavily but sporadically involved in the shipment of tobacco upstream. In many years, none of the upstream voyages of boats from the Gorge carried tobacco. However when they did carry it, they tended to carry large quantities, their mean shipment sizes being amongst the largest of any ports. It was a Gorge boat which was the first recorded bringing tobacco upstream in all the sample years[102]. In most years after this only one or no vessels brought tobacco upstream (Table 6.10), but they carried large quantities. This seems to indicate that the Gorge had a ready market for large amounts of tobacco, but that it was not dependent upon its own vessels to supply it. The pipemaking industry of Broseley may have assisted in the development of a predominant culture of tobacco smoking in the area. However, much may have been transshipped from the boats of Bridgnorth, Upton and other towns, and some may have come overland from Liverpool or its neighbouring ports. The one exception to this pattern was 1722, when the amount carried on Gorge boats shot up to 92,380 lbs on 13 voyages, representing 12% of tobacco carried upstream in that year (Table 6.11). Given its correspondence with the disappearance of Shrewsbury's trade, this may well mainly have been destined for further upstream.

Percentage of voyages upstream with tobacco by home port

	SLP	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1647	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1656	59	0	38	21	12	8	0	15	0	1	0	0	0	0	0	0	0
1666	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1674	57	50	0	30	30	0	25	30	0	0	0	0	0	0	0	0	0
1684	100	17	75	56	64	38	38	60	100	0	0	0	0	0	0	0	0
1697	70	0	37	54	75	44	20	31	58	0	0	0	0	0	0	0	0
1699	90	11	32	42	79	33	0	36	45	0	0	0	0	0	0	0	0
1704	77	0	36	41	79	44	0	11	90	0	0	0	0	0	0	0	0
1705	71	17	30	41	65	55	0	23	75	0	0	0	0	0	0	0	100
1706	71	0	33	51	83	14	0	32	72	0	0	0	0	0	0	0	100
1707	68	0	20	53	69	13	0	56	76	0	0	0	0	0	0	0	0
1708	78	0	25	55	71	67	100	55	72	0	0	0	0	0	0	0	100
1715	67	33	17	45	65	67	0	50	68	33	0	0	0	0	0	0	50
1722	0	81	75	43	68	100	0	35	77	50	0	0	0	0	0	0	71
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	31
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9
1752	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	10
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	6

	SLP	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Corn	Others
1637	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1647	0	1340	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1656	619	0	243	568	562	14	0	469	0	700	0	0	0	0	0	0	0
1666	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1674	3409	5775	0	4427	3967	0	3938	2181	0	0	0	0	0	0	0	0	0
1684	9382	12189	4984	3832	4651	1023	1348	4476	5113	0	0	0	0	0	0	0	0
1697	7665	0	6093	3742	6923	2950	2415	3150	4338	0	0	0	0	0	0	0	0
1699	7401	10825	7685	3647	7404	913	0	3238	2493	0	0	0	0	0	0	0	0
1704	8168	0	1493	4576	7666	1715	0	2449	1751	0	0	0	0	0	0	0	0
1705	3259	6377	2411	4407	7304	1639	0	1858	2613	0	0	0	0	0	0	0	2130
1706	4400	0	1134	3603	5304	20	0	3529	4858	0	0	0	0	0	0	0	4065
1707	4442	0	883	4296	6454	2300	0	3466	3069	0	0	0	0	0	0	0	0
1708	2693	0	1882	4120	6600	530	20827	8495	4754	0	0	0	0	0	0	0	8800
1715	3446	2000	1280	2407	6439	1776	0	1789	1935	361	0	0	0	0	0	0	1341
1722	0	7106	4280	3319	9657	2000	0	4032	4440	220	0	0	0	0	0	0	1202
1733	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2183
1741	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	5285
1752	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1254
1765	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1426

Percentage of voyages upstream with tobacco by boats of each home port

Tables 6.8 and 6.9 Mean shipment sizes of recorded upstream tobacco cargoes, by home port

Voyages upstream with tobacco
by home port

	SLP+	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC+	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Com	Other	Total
1637																		0
1647		1																1
1656	13		3	13	5	1		9		1								45
1666																		0
1674	4	2		13	6		4	10										39
1684	8	1	6	51	34	5	6	27	12									150
1697	14		7	20	46	4	1	10	15									117
1699	28	1	6	25	56	4		12	13									145
1704	17		5	24	41	7		4	18									116
1705	15	1	3	24	34	6		12	15								1	111
1706	17		5	27	39	1		13	18								2	122
1707	15		2	29	45	1		9	25									126
1708	18		3	35	48	4	1	11	23								4	147
1715	6	1	1	25	45	2		8	15	1							2	106
1722		13	12	36	41	1		8	17	1							5	134
1733																	22	22
1741																	7	7
1752																	7	7
1765																	5	5

lbs

	SLP	Gorge	BRI	BWD	WRC	Avon	UPT	TWK	GLC+	Estuary	Wye	BRS	S.Wales	S.W.Wales	Somerset	Dev&Com	Others	Total
1637																		0
1647		1340																1340
1656	8044		728	7378	2810	14		4221		700								23895
1666																		0
1674	13636	11550		57548	23800		15750	21812										144096
1684	75052	12189	29901	195423	158131	5117	8089	120850	61355									666107
1697	107313		42650	74832	318436	11799	2415	31497	65063									654005
1699	212236	10825	46110	91176	414615	3650		38854	32410									849876
1704	138860		7466	109825	314287	12007		9795	31513									623753
1705	48879	6377	7232	105762	248333	9834		22291	39196								2130	490034
1706	74806		5669	97270	206843	20		45881	87452								8130	526071
1707	66637		1765	124570	290429	2300		31193	76737									593631
1708	48475		5647	144187	316807	2120	20827	93440	109347								35200	776050
1715	20676	2000	1280	60164	289768	3552		14313	29032	361							2681	423827
1722		92380	87935	119495	395954	2000		32256	75485	220							6011	811736
1733																	48034	48034
1741																	36995	36995
1752																	8777	8777
1765																	7128	7128

Tables 6.10 and 6.11

Recorded voyages upstream with tobacco, by home port (voyages and lbs)

Bridgnorth, too, was a sporadic carrier of tobacco before 1684. It carried much less tobacco than Shrewsbury, indicating its status as a smaller and also a less wealthy town. Bridgnorth boats carried much smaller mean shipments than did those of either Shrewsbury or the Gorge, but the total quantities they carried far outstripped the boats of the Gorge ports. The port's peaks of trade in tobacco were first in 1684, 1697 and 1699, and then again in 1722. In 1699 Bridgnorth boats carried 46,110 lbs upstream, or over 5% of the total. However this fell back markedly to only 5,647 lbs or less than 1% in the almost equally busy year of 1708. This may indicate, as for Shrewsbury, that supplies to Bridgnorth were coming from the northern ports overland, or that transshipment was increasing. There would have been some effect from the move of the Jackson family, some of the leading upstream shippers of tobacco, from Bridgnorth down to Worcester, but this did not occur until after 1708, when Bridgnorth's share of the downstream tobacco trade was already much reduced. By 1722, however, a surge seems to have taken place. In that year Bridgnorth boats carried 51,358 lbs, or almost 7% of the trade by weight. It seems that Bridgnorth, as Broseley, may have been sharing in the new need to supply Shrewsbury with tobacco now that boats from that port had stopped trading directly from Bristol. The increase in the amounts carried on Bridgnorth and Gorge boats more than compensated for the amount lost from Shrewsbury boats since the turn of the century.

Bewdley was a significant shipper of tobacco, as it was of most things on the river. Its share of the tobacco trade did not match its share of the river trade as a whole however. For example in 1699, 20% of all voyages upstream were by Bewdley boats, but these carried between them only 11% by weight of the tobacco brought upstream. By comparison, the neighbouring port Worcester had 25% of upstream voyages but 49% of the tobacco. This suggests that Bewdley was not a centre of a rich hinterland in which consumer goods could be marketed readily, or else that it had to compete with Worcester as a supplier of luxury goods to the Black Country. Rather, its importance as a centre of river trade was as carrier of industrial goods and bulky raw materials, particularly between the Black Country and Bristol. In most years from 1684 onwards Bewdley boats carried tobacco on about half of their upstream voyages, but the mean shipment size was usually much lower than that on either Worcester or Shrewsbury boats. The fluctuations in the amounts of tobacco carried upstream on Bewdley boats did not follow a clear linear pattern, but varied dramatically. Thus the amount they carried in 1697 was much less than half what it had been in 1684, and it was not much more in 1699. It rose to a peak in 1708 and then fell away far in 1715. Finally, it doubled again before 1722 to make Bewdley boats the second largest carriers of tobacco on the river in that year. Such powerful

fluctuations are difficult to explain, but one reason for them may be that Bewdley may have played a role in transshipping tobacco for ports further upstream.

Boats of the city of Worcester were by far the most important carriers of tobacco in all the sample years studied from 1697 onwards. Before this date Worcester's vessels did not stand out as the leading tobacco shippers, and like all other ports (apart from Broseley in 1647) they carried none in 1637, 1647 or 1666. Even in 1674 and 1684 Worcester boats were exceeded in volume of tobacco carried by those of Bewdley. After 1697, however, the situation became completely different, and it is possible to see the trade of Bewdley, Tewkesbury and Upton in particular suffering at the hands of Worcester carriers. For the remainder of the years sampled, Worcester stood head and shoulders above all the other tobacco carriers on the river. Like Shrewsbury, Worcester's boats carried tobacco usually on around two thirds or three quarters of all upstream voyages. However as Worcester was so much busier a port, the total volume carried was much greater. In 1697 Worcester boats carried 49% of upstream tobacco by weight. In 1704 they carried 50%, in 1715 68% and in 1722 51%. These figures show clearly that by the later seventeenth century, Worcester had become one of the great consuming centres of the Severn valley, as well as one of its leading ports. Bewdley or Tewkesbury might have been expected to have had similar shares of the trade if it had merely been a matter of transshipping and coordinating carriage, but the predominance of Worcester shows that the city was commanded a large centre of consumption all of its own.

Boats of Evesham and Stratford, on the Avon, were tiny carriers of tobacco by comparison with those of Worcester, but they did carry some in every years sampled from 1684 onwards. The amounts carried fluctuated enormously, however, from 20 lbs in 1706 to 12,007 in 1704. The proportion of upstream voyages on Evesham boats with tobacco varied from 13% to 100%. This indicates clearly that the carriage of tobacco was likely to fluctuate wildly if the market area of a port was small, as was the case with the Gorge ports also, simply because retailers would stock up and then sell over periods longer than a year. If there were few retailers in an area, then the effects of their actions on river trade statistics could be enormous.

It is striking by comparison with Worcester how unimportant in the trade were both Upton and Tewkesbury, which were relatively important centres in terms of transshipment of downstream cargoes. Part of the reason for their failure to grasp a large share of the trade must have been that they tended to specialise in sailing to more distant ports; whilst the tobacco trade, as has been shown, was thoroughly centred on Bristol. Another factor must also have been their smallness and poorness as urban centres: and the shipment of tobacco shows this quite strikingly.

The tobacco trade upstream on Gloucester boats also was slight compared with the towns of Shrewsbury and Worcester. No tobacco was carried on Gloucester boats upstream before 1684, and after that time the city's boats rarely carried more than around 10% of the trade. This reflects not only Gloucester's general unimportance as a river port, but also its poor status as centre of consumption. Even it their best year, 1708, Gloucester's boats carried only 109,347 lbs or 14% of the trade. This is surprising, perhaps, given its potential role as a transshipping centre.

The traffic in tobacco of all the ports individually varied much more dramatically than did the trade in tobacco as a whole. This is probably evidence for transshipment of upstream cargoes, which would have distributed demand for tobacco in the Severn region across several different ports whose boats might carry it at any one time. However it may also be evidence for the localisation of variations in the demand for tobacco, at least by retailers. Perhaps shopkeepers found sales and prices difficult to predict and preferred to buy tobacco irregularly, and in fairly large quantities, hoping to sell whenever they could. This can only be speculation, but such a hypothesis would fit with the extreme prominence of the two annual Bristol fairs in the shipment of tobacco upstream (see below), which indicates that much tobacco was bought on these rare occasions.

iv. Trade fluctuations and seasonality

As well as the long-term developments in the tobacco trade which have been discussed, there were large fluctuations from year to year and month to month. As for salt, analysis of the five continuous years sampled from 1704 to 1708 allows some of these shorter-term variations to be discussed.

The variation in the total amounts of tobacco carried in each of the five years was great, as might be expected from the uncertainty of trans-Atlantic trade. The five-year mean of tobacco shipped upstream was 601,908 lbs, but the lowest figure was 490,034 lbs and the highest 776,050 lbs (Table 6.12). These years represent variations below the mean of 19% and of 29% above it: rather greater variations than were experienced in the downstream salt trade[103]. Mean shipment sizes varied approximately in accordance with this, but to a much smaller extent, indicating that the busiest years were made so on the whole by more vessels carrying tobacco rather than the same number carrying larger cargoes. Variation was even greater in the adjacent sample years outside this period. The War of Spanish Succession between 1702 and 1713 was almost certainly handicapping the tobacco trade, as has already been stated, for in 1699 the figure recorded had been 40% above the mean of 1704-8

(perhaps due to the previously mentioned difficulties of international trade and the hazards from privateers in particular).

Table 6.12

Annual variations in the tobacco trade, 1704-8

	Voyages	lbs	Mean shipment
1704	116	623753	5377
1705	111	490034	4415
1706	122	526071	4312
1707	126	593631	4711
1708	147	776050	5280

These figures show that in difficult times the tobacco trade was liable to extreme fluctuations, and that even in a short and more uniform period like 1704-8 it was highly susceptible to variation. This demonstrates, once again, that the methodology of studying widely dispersed sample years must be used only with extreme circumspection. In examining figures for internal trade in tobacco it would be unwise to look for long-term explanations of changes unless they can be shown to be greater than those accounted for by much shorter-term variations in magnitude described here.

It is difficult to explain these short term variations, and many contingent factors may have been responsible for them. It seems likely that factors such as the size of the crop in the New World and the success of its shipment across the Atlantic must have had some effects. With the perennial dangers from grubs which often consumed whole crops[104], from hurricanes, and from privateers, it is not surprising that there should have been great variations. However it is even more difficult to assess possible factors for variation in demand within the Severn valley region. The indication of destinations for tobacco shipments upstream may give some clues to this. The amount of tobacco shipped by boats from each home port in fact varied considerably more than did the total. The range of annual shipments on all Salop boats, for instance, was from 138,860 lbs in 1704 down to 48,879 lbs or barely one third in the following year. Worcester boats, similarly, varied from 316,807 lbs in 1708 to 206,843 in 1706, or just over two thirds. The trade on Bewdley boats varied by a similar proportion. All other ports had even larger proportional variations. In many years the variations which

were experienced by boats of particular ports were not synchronised with the variations of the trade in general. Shrewsbury's lowest year, for instance, was the busiest in terms of the tobacco trade in total. This adds to the circumstantial evidence already described which suggests that a great deal of transshipment was taking place, and indeed the greatest variation was experienced by the smaller ports which may have not had substantial consuming hinterlands of their own, such as Tewkesbury and Upton, and Bridgnorth. However the variations of a port such as Worcester suggest that localised fluctuations in demand and the temporary effect of supply and demand in previous years in these places were indeed leading factors in creating the variations in the tobacco trade as a whole. Variations overall were the aggregate of many more chaotic local ones.

The enormous fluctuations recorded for tobacco shipments over the whole period studied in the Coastal Port Books are probably less suspect than those in the records of overseas trade. They are therefore probably much less a reflection of the level of evasion of duties than of genuine changes in the supply and demand for tobacco. Thus, the figures from the Gloucester Port Books help to indicate much more reliably than can any of the other figures used by historians that the new 'luxury' consumer good of tobacco did oscillate substantially in its level of consumption over a long period. Such variations from year to year must have been a result most directly of buying and selling stocks of tobacco in particular places, but the very fact that supply was not smoothed by retailers who controlled and mediated the trade suggests that demand was to a large extent capricious. Addiction to the drug was not, as yet, creating a continuous and inelastic demand. This is perhaps not surprising given the perennial difficulties of supply and the enormous variations that occurred in the conditions of the mass of the population. The inventories of retailers show the prices of ordinary or medium quality cut tobacco were fairly stable at around 8d to 11d per lb after the great fall in prices around the middle of the century (Table 6.1). Consumption does seem to have fallen during times of hardship, such as the wartime years 1704-8 and the year of the Jacobite Rebellion of 1715. Such a correlation must, however, remain extremely tenuous until further years can be examined in a more continuous sequence.

Seasonal variations in the upstream shipment of tobacco were extreme, as is shown even by figures averaged over the whole of the five year period from 1704 to 1708 (Table 6.13). Their interpretation shows some important characteristics of the course and organisation of trade in the period. The variation from month to month does not follow any continuous curve, but shows a series of sharp peaks at different times of year. One month stands out above all the others, namely February, in which

Tables 6.13 and 6.14

Recorded upstream shipments of tobacco, by month, 1704-8
Recorded upstream shipments of tobacco, by month, 1699, 1715 and 1733

Tobacco shipped upstream 1704-8 inclusive
by month of the year

	Tobacco carried (in lbs) lbs 5 years	Mean per month	Percent of total	Voyages with tobacco Voyages 5 years	Pc of all voyages	Mean per month	Mean shipment size	All voyages
Jan	226345	45269	7.52%	48	53.93%	9.6	4716	89
Feb	535529	107106	17.80%	76	67.26%	15.2	7046	113
Mar	292170	58434	9.71%	59	46.46%	11.8	4952	127
Apr	241678	48336	8.03%	47	39.50%	9.4	5142	119
May	256745	51349	8.53%	48	42.11%	9.6	5349	114
Jun	152486	30497	5.07%	41	35.04%	8.2	3719	117
Jul	217250	43450	7.22%	48	42.48%	9.6	4526	113
Aug	344830	68966	11.46%	75	57.69%	15	4598	130
Sep	66282	13256	2.20%	34	38.20%	6.8	1949	89
Oct	191860	38372	6.38%	47	50.00%	9.4	4082	94
Nov	317588	63518	10.56%	59	58.42%	11.8	5383	101
Dec	166776	33355	5.54%	40	50.63%	8	4169	79
TOT	3009539		100%	622				1287
12 month mean		601908				124.4	4838	

Tobacco shipped upstream 1699, 1715 and 1733
by month
in lbs

	1699	Mean 1704-8	1715	1733
Jan	29112	45269	50369	90
Feb	127041	107106	65332	0
Mar	65025	58434	9939	770
Apr	49656	48336	19143	1400
May	48800	51349	6687	2390
Jun	83658	30497	32398	6820
Jul	125837	43450	34827	6208
Aug	162731	68966	65784	200
Sep	77338	13256	43089	2300
Oct	33414	38372	13582	14942
Nov	30504	63518	59394	296
Dec	16760	33355	23283	12618
TOT	849876	601908	423827	48034

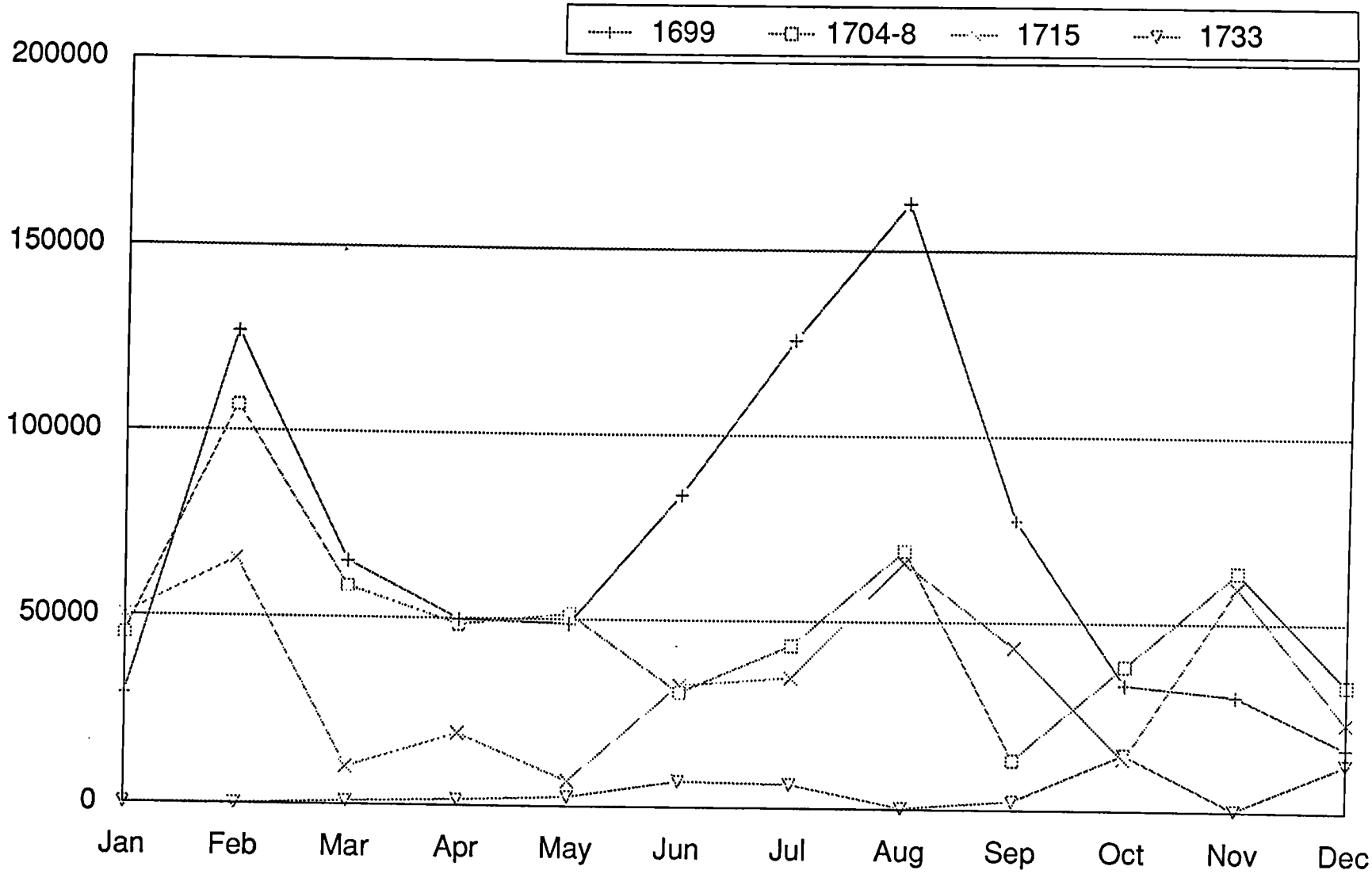


Figure 6.1

Monthly recorded tobacco shipments upstream, 1699, 1704-8, 1715 and 1733

nearly 18% of the tobacco was carried and an average of 15 voyages were made. This was also the month in which the greatest percentage (67%) of voyages upstream included tobacco in their cargoes and had by far the largest mean shipment size, at 7,046 lbs. The second month to stand out is August, in which over 11% of the tobacco was carried on a similar number of voyages and almost 58% of upstream voyages carried the commodity. November and March then come close behind with smaller peaks. In both months about 10-11% of the tobacco was carried on an average of 12 voyages each. The deepest trough was clearly September, in which only 2% of the tobacco was carried on an average of 7 voyages with the smallest of the mean shipment sizes at 1,949 lbs.

This pattern seems extraordinary, and indeed not readily credible. However the use of a five-year mean should have ironed out any exceptional factors which attended any one month in any one year, unless they were of astounding proportions. Moreover, other single sample years show a similar pattern (Table 6.14 and Figure 6.1). In 1699, August and July together form the greatest peak of shipments, but February also stands out well above the rest of the traffic. The greatest trough is not September but December. In 1715, the peak months were August and then February, with November the next largest. The quietest months were May, March and October, in that order. Only 1733 shows marked deviations from the basic pattern of two main peaks around February and August, but it may be complicated by the fact that so much less of the tobacco on the river was being recorded at this time. In this year, February had no tobacco carried at all and August also was low. The peaks were in October and December. Naturally, single years such as these may display their own deviations from the average. Nevertheless, all the data except that for 1733 strongly support the idea of sharp peaks of shipment upstream in February and August with a lesser peak in November and troughs in the spring and autumn.

There are a number of variables that might explain such a pattern. The most obvious is that it relates to the growing cycle of tobacco. This was a seasonal crop in North America and the West Indies, but curing and packing went on over several months. Most hogsheads were usually packed from about October to December or January, although smaller quantities might be packed through until May or June. With long loading delays in America, ships did not usually sail for England carrying the harvest until winter or early spring[105]. One writer in the seventeenth century stated that after picking and curing in Virginia and Maryland, 'they ship it out from the month of October till April following'[106]. Most Atlantic crossings from west to east usually took about eight weeks, so most vessels arrived at English ports in the spring and early summer. In 1687, for instance, of 27 arrivals in Bristol from

Maryland and Virginia, 21 arrived between March and August[107]. In 1731 the entries in the Bristol Overseas Port Books mentioning tobacco were much more numerous and the emphasis had shifted markedly to the autumn. Of 684 entries, 84 were made in the first quarter of the year from the end of December, 52 in the second, 270 in the third, and 278 in the fourth[108]. This therefore shows a quite different pattern from that found in the Gloucester coastal books, of trade peaking in the summer and winter. This may have resulted from changes at about this time in shipment patterns from North America which arose from greater administrative delays and greater mercantile stockholding within the colonies[109]. In fact, one would expect the seasonal patterns of tobacco import to have little relation on the whole to shipments up the Severn. Surely, Bristol tobacco merchants would have controlled and regulated the flow of tobacco and not have sold it all at once.

Yet the strongest correlation by far of events with the peaks of trade on the Severn in tobacco appears to be with the two principal fairs in Bristol in the period[110]. The St. James's Fair at Bristol began on 25 July and was a crucially important event in the mercantile life of the city[111]. A letter from Graffin Prankard in 1730 in his role as an overseas merchant, though not the tobacco trade in particular, indicates his anxiety that his ship the *Pareham* should leave Carolina. His agent was to 'strive hard for getting her cleare by the faire'[112]. The fair at the end of July would have been an opportunity for merchants and buyers from the Severn valley who came to Bristol for the event to take tobacco upstream as soon as the fair was over[113]. The fact that upstream tobacco shipments were so low again by September gives great credence to this kind of sudden cause for the peak. It is also supported by the fact that in 1733 the peak seems to have shifted to October, and the date of St. James's Fair was moved in 1731 to 1 September. The fair was also of considerable importance in the iron industry, largely for traders from as far away as south Wales and the west midlands to settle debts[114]. The fact that in 1733 this was the only substantial peak in the trade may also reflect the shift to autumn arrivals of tobacco from the colonies.

The peak of traffic in February, similarly, can be closely related to the second of Bristol's great fairs, St. Paul's, which was held in January. The peak for February, like that for August, was short in most years, indicating that a sudden burst of tobacco marketing of this sort shortly before it was the most likely cause. It may perhaps have been specially large (as it was on average in 1704-8) because it was the main opportunity for merchants to sell their last year's stocks just as the new tobacco began to arrive from Virginia. The date of the fair moved in 1731 to 1 March and the February peak in traffic was no longer visible in the figures for trade to Gloucester in 1733[115].

It is clear that the seasonal patterns that emerge in the upstream tobacco trade were influenced strongly by the two Bristol fairs. In the five years 1704-8 the post-fair months of February and August were responsible for 29.26% of the trade instead of the 16.66% that an even distribution of would represent over two months. At the least, then, it seems likely that the Bristol fairs were directly responsible for some 13% of upstream tobacco shipments. The amount of tobacco that went through the fairs but then to other wholesalers or warehousemen before passing upstream may, of course, have been much larger. Even so, the fairs must be regarded as determinants of important seasonal fluctuations but not the major suppliers of tobacco on the Severn.

v. Organisation

Tables 6.15 to 6.17 list all the merchants involved in the tobacco trade upstream through Gloucester in three sample years: 1674, when the trade was still relatively new; 1699, when it reached its peak for all the sample years studied; and 1722, the last year for which accurate data are available.

In 1674 there were 19 different merchants involved in the upstream tobacco trade. Few of these carried tobacco on a high proportion of their voyages (except for people who only made one or two voyages altogether). Of the 15 people who made more than one voyage with tobacco, only six carried it on over half their upstream voyages. Even the biggest of the carriers, John Beale, only carried tobacco on four out of his nine voyages. The trade was widely distributed between the merchants who carried it. Although 50% of the trade was carried by the top five merchants, more than half the merchants carried more than the mean for them all.

The merchants involved in the trade at this time can mostly be recognised as the most important general river carriers of the period. The top five who carried over half the tobacco were John Beale of Bewdley, one of the principal trowmen on the river, Humphrey Tyler and Francis Sheldon of Bewdley, who were also important trowmen, Warner Chance of Worcester and Samuel Gough of Salop, both of whom operated their own boats back and forth from their respective towns reasonably regularly. The concentration of Bewdley trowmen, taking up the top three places in this ranking, is notable. The tobacco trade was a fairly new one in 1674, and it may be that the Bewdley trowmen were best placed to take it on quickly, since they operated between them some of the most regular services on the river. Merchants of Worcester and Shrewsbury came next, presumably because these towns were important places for the consumption of tobacco.

Tables 6.15 and 6.16

Recorded shipments of tobacco upstream, by merchant, 1674 and 1699

Merchants carrying tobacco upstream
In 1674

	Merchant	Port	Tobacco voyages	All voyages	lbs	Mean Shipment
1	John Beale	BWD	4	9	22050	5513
2	Humphrey Tyler	BWD	3	5	14358	4786
3	Francis Sheldon	BWD	2	3	12600	6300
4	Warner Chance	WRC	2	5	11900	5950
5	Samuel Gough	SLP	2	2	11200	5600
6	Samuel Claroe	UPT	2	6	10850	5425
7	Thomas Vickers	TWK	2	3	8400	4200
8	Thomas Crouch	TWK	4	9	8162	2041
9	Thomas Field	BRO	1	1	8050	8050
10	Samuel Jackson	WRC	2	5	7700	3850
11	Thomas Claroe	UPT	2	5	4900	2450
12	Richard Corker	BWD	2	4	4340	2170
13	John Sheldon	BWD	2	2	4200	2100
14	John Chance	WRC	1	7	3850	3850
15	William Hornage	BRO	1	1	3500	3500
16	Francis Vickers	TWK	2	2	2800	1400
17	Richard Vickers	TWK	2	4	2450	1225
18	Thomas Waine	SLP	2	4	2436	1218
19	Robert Reynolds	WRC	1	2	350	350
	TOTAL		39		144096	
	Mean per merchant		*1*		*7584*	
	Median carried				8050	
	Overall mean shipment size					3695

Merchants carrying tobacco upstream
In 1699

	Merchant	Port	Tobacco voyages	All voyages	lbs	Mean Shipment
1	William Perkes	WRC	22	28	173870	7903
2	Peter Noxon	WRC	13	15	111706	8593
3	William Hancocks	SLP	15	15	106432	7095
4	John Jones	SLP	10	10	91204	9120
5	John Chance	WRC	15	19	86580	5772
6	George Perkes	BWD	12	15	46188	3849
7	Stephen Perkes	BWD&W	5	5	36269	7254
8	William Fisher	TWK	7	9	28818	4117
9	William Baily	GLC	7	9	20700	2957
10	William Alloway	BRI	1	1	20000	20000
11	John Coldrick	BWD	7	11	18478	2640
12	Edward Jackson	BRI	2	3	17510	8755
13	Samuel Bowd	BROEVS	4	7	13675	3419
14	Charles Corker	BWD	1	4	12560	12560
15	Richard Lewis	GLC	6	13	9608	1601
16	James Harrisson	EVS&TW	4	9	9338	2335
17	Francis Asbury	BRI	3	3	8600	2867
18	Humphrey Tyler	BWD	1	1	7436	7436
19	Richard Hitchinson	WRC	2	2	7230	3615
20	James Davies	SLP	1	2	6100	6100
21	Richard Farley	SLP	1	1	5000	5000
22	Francis Perkes	BWD	2	2	3874	1937
23	John Face	SLP	1	1	3500	3500
24	William Lewis	GLC	1	2	2600	2600
25	John Hale	BWD	1	1	1600	1600
26	Thomas Roberts	EVS	1	3	1000	1000
	TOTAL		145		849876	
	Mean per merchant		6		32688	
	Median carried				13117	
	Overall mean shipment size					5861

Table 6.17

Recorded shipments of tobacco upstream, by merchant, 1722

Merchants carrying tobacco upstream
In 1722

	Merchant	Port	Tobacco voyages	All voyages	lbs	Mean Shipment
1	George Bradley	WRC	20	23	206936	10347
2	Edward Jackson	WRC	20	24	187018	9351
3	Thomas Williams	BRO	13	14	92380	7106
4	John Beale	BWD	24	35	83349	3473
5	Richard Lewis	GLC	11	11	56525	5139
6	Richard Asbury	BRI	1	1	37277	37277
7	Franis Asbury	BRI	7	8	36577	5225
8	John Harrisson	---BWDT	4	8	19823	4956
9	Samuel Price	---STRBW	4	6	19307	4827
10	Francis Owen	GLC	5	8	18060	3612
11	Nicholas Harrisson	TWK	4	6	14304	3576
12	Rowland Smithiman	BRI	3	3	13687	4562
13	George Perkes	BWD	5	7	13115	2623
14	Margaret Perkes	BWD	3	9	7200	2400
15	William Bradley	BRI&WR	2	4	2394	1197
16	John Coldrick	BWD	1	1	1116	1116
17	William Hyett	GLC	1	1	900	900
18	Thomas Detheridge	TWK	2	7	870	435
19	John Pearce	---	3	3	678	226
20	William Cupitt	GTT	1	1	220	220
	TOTAL		134		811736	
	Mean per merchant		7		40587	
	Median carried				16182	
	Overall mean shipment size					6058

In 1699 a larger number of merchants, 26 in all, were involved in carrying tobacco. However the total quantity carried had grown much more and the mean amount carried per merchant was 32,699 lbs, or more than four times what it had been 25 years earlier. Many more of the people involved in the trade took tobacco on a fairly regular basis: of the 17 who made more than one voyage with tobacco, 15 carried it on over half of their upstream voyages. Several of the tobacco carriers, like John Jones of Salop and William Hancocks of Salop, took the commodity on all of their upstream voyages. Although more people carried tobacco in this exceptionally busy year, the trade was much more concentrated proportionately than it had been in 1674. Now 50% of the trade was carried by the top four merchants, and the largest of them carried nearly eight times as much as had the largest in 1674. Seven merchants, or just over a quarter of them, carried more than the mean.

The top four merchants who carried half the tobacco in 1699 were William Perkes of Worcester, Peter Noxon of Worcester, William Hancocks of Salop and John Jones of Salop. The Bewdley trowmen had by now slipped much further down the ranking, and it seems that the trowmen of Worcester and Shrewsbury, as two of the principal markets for tobacco on the river, were taking a leading role. All of them, as in 1674, however, were general trowmen who operated fairly regular services. The amount carried by William Perkes, the biggest merchant in the trade, is particularly impressive if examined in conjunction with other members of his family. George, Stephen and Francis Perkes also carried tobacco in 1699, and with William's this amounted to 260,201 lbs or over 30% of the total carried in the year.

The trade was yet further concentrated in 1722. Although this, too, was an extremely busy year, only 20 merchants were now involved in the tobacco trade. The mean carried per merchant had grown by another quarter to over 40,000 lbs. Even more of the people involved in the trade carried tobacco regularly. Of the 16 who carried tobacco on more than one occasion, 14 carried it on half or more of their voyages. The trade was yet further concentrated in a few hands, 50% of the trade being carried by the top three merchants. The mean amount carried per year had been so much shifted towards these leaders of the trade that only four merchants, or one quarter of them, carried more than the mean.

The top merchants, who carried half of the trade, in 1722 were George Bradley of Worcester (with his son of the same name), Edward Jackson of Worcester and Thomas Williams of Broseley. Carriers from Shrewsbury no longer appeared at all as carriers of tobacco themselves. There is no reason to think that the tobacco consumption of Shrewsbury had fallen away dramatically as the town was flourishing at the time, so that it must have obtained its tobacco by different means. Some could

have come overland from Liverpool by this time, as that port was garnering an increasing share of the national tobacco trade and was reasonably close to Shrewsbury by land. However it seems likely that tobacco carried up the Severn by certain merchants was actually for the Shrewsbury market. All of the top three merchants, in fact, had strong Shropshire connections. George Bradley and his son, though 'of Worcester' in 1722, had for many years operated on boats from Montgomery and Worcester at different times, and before 1715 commonly appeared on boats of Benthall in the Severn Gorge, and occasionally boats of Shrewsbury itself[116]. Edward Jackson of Worcester, too, had important Shropshire connections. The Jackson family operated boats from Bridgnorth until they moved to Worcester in 1711. Finally, Thomas Williams, the third of the carriers of tobacco in 1722, operated from Broseley, which was only some 12 miles from Shrewsbury. Whilst Shrewsbury merchants themselves had disappeared from the trade by 1722, it seems that the big tobacco merchants of the river by now were well placed to satisfy the needs of a wide area, and this must have been one reason for their success. Merchants based in Worcester and with connections with Shrewsbury, Bridgnorth and the Gorge would have had some of the principal markets for tobacco in the region at their disposal.

The merchants responsible for carrying tobacco on the Severn seem to have been of rather different kinds from those carrying salt, reflecting different organisational patterns in the trade. In a similar way to the salt trade, one might search for certain kinds of organisation of carrying. As one finds salt producers who were also merchants on the river, one might expect to find tobacco importers who appear in the river trade. River traders who bought and sold tobacco on their journeys might also be predicted. One would also expect to find carriers who took tobacco by freight, loading consignments for specific dealers and customers without being directly involved in buying and selling themselves at all. Finally, one would expect some boats to have been chartered to carry tobacco on special journeys.

The first category, of carrying merchants who were also tobacco importers, seems to have been rare or non-existent. None of the names associated with tobacco shipment on the river in 1674, 1699 or 1722 can be recognised as those of known tobacco dealers. Even someone like Graffin Prankard, who operated his own boats on the Severn and was a substantial foreign merchant to Carolina amongst other places, did not carry tobacco upstream. In both 1733 and 1741 Prankard was recorded making many downstream voyages carrying salt and sometimes iron, but he was never recorded as merchant on any upstream voyage, let alone one with tobacco. Of the people who made shipments from places other than Bristol, referred to above, it seems that William Alloway was a domestic merchant and Andrew Carder may have

been a foreign one. Carder's two exceptional voyages upstream in 1699 are the only ones that have come to light which may be interpreted as by an importer himself.

River traders who bought and sold tobacco on their journeys are more difficult to identify. It is clear, however, that no merchant specialised in the tobacco trade completely, unlike Seacombe in the salt trade for instance. Even the merchants recorded carrying the most tobacco, like Beale, Perkes and Bradley, did not do so on all their journeys, and they always carried large and varied cargoes of which tobacco formed only a part. In the absence of account books for such people it is impossible to say whether or not they bought and sold particular goods. The circumstantial evidence of the amounts of tobacco they carried, however, might suggest that they did not buy and sell it. The overall mean shipment size carried up the Severn in 1722 was over 6,000 lbs, yet shopkeepers tended to stock no more than a few hundred lbs at this date. A merchant trading upstream would therefore have to make contacts with perhaps a dozen or two dozen retailers in order to sell his cargo, and in the meantime he would have a large amount of capital tied up in his stock. Assuming a wholesale price of some 5d. per lb on average, the mean shipment upstream in 1722 was worth perhaps £125. Nevertheless it may have been the case that some river merchants did act as traders in this way, if only on occasion. If not, why would certain carriers like Bradley, Jackson, Perkes and Owen be able to engross such a large proportion of the trade? They were not the biggest carriers on the river in terms of all goods, so what could have attracted tobacco dealers to use them in particular as carriers? Perhaps they were, indeed, carrying some tobacco on their own account. It does seem feasible that some of the smaller tobacco carriers could have done this. Thomas Detheridge of Tewkesbury, for example, carried tobacco on two of his seven voyages in 1722, but this amounted to a mean shipment size of only 435 lbs. This would be a much more realistic amount for one trowman to risk his capital over and to have a chance of selling. The evidence for this kind of operation is therefore slight and contradictory. It is clear that no river carrier bought and sold tobacco as a sole specialism, but it is possible that some did buy and sell when the opportunity arose.

It seems likely that the majority of tobacco passing up the Severn was carried as freight on orders from tobacco wholesalers and retailers. The importance of long-distance contacts between dealers may be shown by the importance of the Bristol fairs in causing a seasonal burst of tobacco shipments: these were occasions when buyers from far afield came to the city to buy and to settle debts. The packing of the tobacco may suggest that most cargoes were made up of several different consignments. Most entries for tobacco in the Port Books were in a form such as: '3 hogsheads 2 barrels 1 truss 20 boxes tobacco quantity 3000 lbs'. The facts that the individual packs were

described first, with the weight given after, and that those packs were so various, adding up almost always to a number that was far from 'round', does imply varied consignments rather than one big one. This would be the case if wholesales in Bristol were packing up tobacco according to orders from various retailers and other clients in the Severn valley. No evidence has been found to indicate whether shipment was paid for and organised by the vendor or the purchaser, but it is clear that most of the people carrying tobacco were those who operated regular services and could be called upon by dealers to carry freight. Taking 1699 as an example, nearly all the people involved in tobacco carrying were trowmen who operated fairly regular services. All of the top six carried tobacco on what were effectively 'packet' services of this sort. Much the same was true in 1674 and 1722 also.

There is little evidence to suggest whether the vendor or the purchaser of the tobacco paid for and organised its shipment in these cases. For example the account book for 1755-6 of John Blagdon, a Bristol merchant who dealt in tobacco, does not indicate any payments to inland carriers for its transportation[117]. However the private journal of one young merchant, Richard Wintle of Newnham, suggests how he dealt in tobacco in 1783. Wintle had six casks of tobacco he wished to sell, and wrote to the trowman Noah Pearce of Worcester saying he wanted to sell it there, and arranged a Customs certificate from Gloucester to cover it. The next day he put the tobacco on board a trow for Gloucester. On the day after that Wintle went to Gloucester to catch up with his tobacco, but found that the trowman he had used had already sent it on for him to Worcester by wherry. He then paid freight for the tobacco to the trowman who had carried it to Gloucester. In the following week he went on to Worcester himself, and then to Bewdley where a contact at Upton had told him he could find a particular buyer for his tobacco. Back at Worcester Wintle had his tobacco put on a wherry for Bewdley and went with it to deliver it to his buyer there, a Mr Kendrick. Kendrick paid him a bill upon London of £159 10s. 6d[118]. In this case, the vendor paid freight and organised carriage, with a little help from various trowmen, and collected payment in person from the purchaser.

The chartering of vessels to carry tobacco does not seem to have occurred as a rule. Identifiable tobacco dealers, as has been said, do not appear as merchants in the Port Books, and vessels hardly ever appear just carrying tobacco. There was perhaps no need to charter for several reasons. First, tobacco was not likely to come in large bulky shipments, and therefore could usually be accommodated on a vessel carrying other goods. Second, there was considerable spare capacity in upstream shipping from Bristol: many vessels seem to have returned with no cargo at all according to the Port Books, and some of those which did carry goods took only a few small items.

The only occasions on which merchants are identified in the Port Books who were not trowmen were in 1699 and 1708. These examples have been discussed above: large shipments were brought from Bridgwater by William Alloway, an inland merchant of Somerset, and from Ilfracombe by Andrew Carder, who may have been a tobacco importer. Only on these occasions, when exceptionally large shipments were being carried from unusual locations, does it seem to have been necessary for dealers to charter vessels.

The tobacco trade grew during the period studied from nothing to become one of the staples of carriage. By the 1680s and until the 1720s, tobacco was carried on around half of all recorded upstream voyages. Little has been established previously about internal trade in tobacco. However, the new evidence about the Severn shows clearly its importance and its prodigious growth. Whereas no tobacco was carried in 1637, there was a complex trade amounting to over 800,000 lbs a year by 1722. Tobacco was one of the most valuable trades on the river from the later seventeenth century onwards.

Such growth gives some impression of the potential for the development of new consumer markets. Wealthy urban centres such as Worcester and Shrewsbury were by far the most conspicuous places of consumption, but industrialising areas like that around Bewdley also became important and demand became ubiquitous. The course of the tobacco trade shows the vulnerability of new luxury goods to variations in supply and demand, whether caused by difficulties of importation or reduced circumstances at home. Fluctuations from year to year were large, and in 1666 there was even a total reversal of trade patterns owing to problems of supply. The capriciousness of the trade was also reflected in an apparently chaotic transshipment and speculation and in wide variations from year to year in the relative amounts carried on boats each river port. Never-the-less, trade was able to grow and the concentration of carriage with fewer merchants by the early eighteenth century shows that levels of organisation were rising.

The trade in tobacco shows that the Severn was important as a transport route even for valuable goods: at the end of the seventeenth century the tobacco carried up the river amounted to some 7% of national consumption. It also illustrates clearly the dominance of Bristol over the economy of the Severn Valley, since even substantial tobacco ports within the Bristol Channel were almost never directly involved in shipments up the river. The key place of the Severn in Bristol's prosperity is indicated by the fact that over a quarter of its retained imports of tobacco in 1722 were recorded being shipped through Gloucester.

CONCLUSION

This thesis has described the development of new methods for the analysis of a uniquely valuable source in order to undertake a case study of the Severn, one of the most important arteries of trade in pre-industrial England. New insights have been possible, as a result of the computerisation of coastal Port Books, into the nature and role of internal trade in the economy. It is clear that the Port Books record an incomplete volume of trade on the river, excluding trade which did not pass through the Port of Gloucester and certain categories of goods and voyages that it was not deemed necessary to oversee. However they provide a quality of evidence not available from any other source for inland trade in the period, and this can be utilised effectively. The methods and data sets developed will permit much more detailed and extensive work in the future on the navigation of the Severn and the coasting trade of England and Wales from the sixteenth to the eighteenth centuries. Already, however, some conclusions can be drawn concerning the trade of the Severn and the re-evaluation of the role of rivers in the period, the development of trade between the Civil War and the industrial revolution, and the relation of internal trade to the broader pre-industrial economy.

i. Re-evaluating the role of rivers

It was shown in the Introduction that whilst river navigation has been regarded by historians as an important means of trade in pre-industrial England, few detailed studies have been made of its conduct and character. Willan, Hadfield and others have made vital contributions to knowledge of the development of waterways networks, and others have studied individual river improvement projects[1], but there has been a paucity of detailed investigations of the patterns of river trade, the goods carried, the mechanisms of carriage, or changes in these characteristics over time[2]. This study of the Severn has provided much new information which permits the nature of river carriage to be assessed.

The Severn is an important example from which wider conclusions can be drawn. First, it was the longest and one of the most heavily used river navigations in England throughout the pre-industrial period, and its importance means that findings about it are automatically representative, to a degree, of river navigation in the country. Second, it can be shown to be in some ways representative of other navigations. The

Severn is commonly thought of as unlike other rivers because it was navigated without improvements or a controlling authority, and by a mixture of flat-bottomed coasters and dedicated river barges. But how far was this atypical in the period? In the early seventeenth century, most of the great river navigations operated in this way: the Severn, the Trent, the Yorkshire Ouse, the Great Ouse to Huntingdon[3], and the Thames up to and through the capital.

Beyond London, the Thames was navigable only by flash locks, and was controlled by its own conservancy; but the Trent, the third great river of the kingdom, was naturally navigable with no commanding authority for 94 miles from Wilden Ferry in Derbyshire to the Humber. The Humber itself provided connections to Hull, with the Don to Doncaster, the Ouse to York, the Derwent to Stamford Bridge, the Aire to Knottingley, the Hull to Driffield: all without navigation authorities and unimproved, and mostly accessible to coasting vessels as well as river boats[4]. The Trent was not improved until the 1770s, the Hull never, and the Yorkshire Ouse only in the 1750s[5]. On the continent, great rivers such as the Rhine, the Schelde, the Loire, the Meuse, the Volga, and the Danube were navigable for great distances inland by a variety of vessels without improvement[6]. Throughout England and Wales there were also many smaller rivers which were navigated in similar ways. The following were all navigable for some distance inland by barges and coasters without improvement or control: the Tyne, the Tees, the Nene, the Yare, the Medway, the Kent Stour, the Sussex Rother, the Tamar, the Parrett, the Bristol Avon, the Wye, the Usk, the Towy, the Conwy, the Dee, the Weaver, the Mersey and the Lune[7]. Many were improved and extended later, but within the period the new, controlled river navigations which have had so much attention from historians were by comparison of little importance. Willan estimated that there were 685 miles of navigable river by 1660, when improvement began on a large scale, and 1,160 miles by the 1720s[8]. Many of the estuaries and rivers mentioned above are not included in the former figure, so that perhaps two thirds of the mileage of English and Welsh river navigation were already in use by the time that improvement began. The Severn had only two vital differences from many other navigations: the particular regions it served, and the fact that it had a Customs port to record its traffic. The character of its trade may be seen as similar to many other rivers in the period.

The literature on river navigation in the pre-industrial period emphasises its difficulty and irregularity, suggesting that it was of limited benefit before the improvements of the 1660s onwards[9]. This view requires re-assessment in much the same way as the 'binding mud analysis' of pre-industrial road transport has been re-assessed by Chartres, Freeman, Pawson and others[10]. It is belied by the use of so many naturally navigable rivers, and the volume and regularity of trade which can be

demonstrated on the Severn. The Gloucester Port Books record 400 voyages per year downstream, and some 250 upstream at their peak in the first quarter of the eighteenth century. To this must be added the trade which used only the upper parts of the river, the trade between the Midlands and the Forest of Dean, and other voyages which were not recorded. The number of vessels passing the quay at Gloucester may have been 1,150 a year, or about 22 a week, in the early eighteenth century. This seems sleepy and unhurried by later standards, but it compared favourably with contemporary inland trade. For example, long-distance road carrying services to and from London at this time consisted of only about 450 services a week, carrying perhaps 800 tons[11]. If vessels on the Severn carried an average of about 35 tons, the river trade through Gloucester was approximately equal in weight to all the long-distance road traffic from the capital. Nef has estimated that the coal carried on the Severn, which seldom passed through the port itself, comprised nearly a tenth of the waterborne coal of Britain[12], by both river or coast. Comparison with coasting is less favourable, especially as little coal passed through Gloucester. But in 1728 even London, then the busiest port in the world, received only some eleven times as many coastal voyages as passed out of Gloucester[13], though the capacity of the vessels was much larger. Albeit that trade at Gloucester was not vast, it is clear that the Severn was navigated on a large scale.

The regularity of trade on the Severn can also be shown to have been high, conflicting with the accepted view that river trade was forever delayed and disturbed[14]. It is certain that there were delays, particularly on the uppermost reaches of the river, and these seem to have become more serious during the eighteenth century. Thomas Telford recorded in the 1790s that barges in the Ironbridge Gorge were often stranded for several weeks, and in the 1720s the manager of an iron forge in Montgomeryshire recorded having to load a barge at 2am in order to catch the river in spate, only to have it held up again before Shrewsbury[15]. There were also problems of vessels running aground, sinking or being damaged, such as a trow sailing from Bristol to Worcester in 1758 which was blown onto shore and destroyed when water got to its cargo of lime[16]. Even so, the trade of the Severn achieved a regularity. For example, vessels sailed from Bewdley to Bristol four or more times per month and failed to do so on only one occasion in the 60 months 1704-1708[17]. Trade did vary seasonally, but its peak was in the summer, when navigation would have been most difficult. The seasonality of voyages seems to have been demand led, judging by both this and the seasonality in specific trades, rather than enforced by conditions of the navigation. Even vessels from the Shropshire ports, which were most affected by the difficulties of the upper navigation, have been shown to have been distributed reasonably evenly around the year. For example in 1706 no individual month had less than 4% of the year's

downstream voyages of Shropshire boats. There can be no doubt there were delays and problems, but trade was not seriously affected in most circumstances.

The goods carried on the Severn were much more diverse than views of river navigation in the period normally allow[18]. The Port Books for Gloucester record some 200 different kinds of goods carried each year, and an enormous diversity of some 2,500 goods and commodities carried during the period studied. The river not only served the basic and regular commodity trades, but also people who wished to send just one or two consignments. Its trade reflected the full diversity of life in the period as much as the regular and consistent patterns of supply and demand. If any classification of goods traded in the pre-industrial period is devised, many goods of each class can be shown to have been traded frequently on the Severn; and this is the case whether the classification is based on concepts of trade sector, the type of organisation involved in production, processing stage, or bulk to value ratio. Certain types of goods have been shown to be less well represented than others: for example the goods of domestic production are relatively little apparent in the river trade, and it has been suggested that the nature of transport needs within the domestically-centred trades encouraged a wider use of roads than either urban trades or heavy industries. However, even these sectors did result in an appreciable level of trade on the river, for example with regular traffic in textile raw materials and fabrics and small metalwares.

It is clear from the numbers of voyages per year in broad categories of traded goods that each was represented in a high proportion of voyages. In most of the sample years studied, seven out of eight categories of goods was each carried on between 40% and 80% of all downstream voyages, the only category not well represented being sea goods. Each of the eight categories was represented on between 25% and 70% of upstream voyages.

Bulky goods like salt, clay, coal and grain were certainly common and important items of cargo on the Severn. Water transport gave massive cost advantages for the transport of such goods. However goods of high value in relation to their bulk were also carried with great frequency and regularity. In the early eighteenth century, well over 1,000 chairs were carried downstream through Gloucester in almost every year. Some 3-4,000 gross of tobacco pipes were carried, appearing on up to 10% of downstream voyages. Glass or glassware appeared on 20% of all recorded downstream voyages in 1715, and pins on 6%. By 1722 over 800,000 lbs of tobacco per year were recorded coming upstream through Gloucester, representing well over a quarter of all retained tobacco imports at Bristol. Money, a cargo with an exceptionally high weight to value ratio, was carried on about one in eight of recorded downstream voyages in the

first quarter of the eighteenth century[19]. The picture presented by these trades is one of regular use of water transport for all kinds and qualities of goods that were available to be carried, not the relegation of rivers to the bulk commodities which have generally been presented as the rule. It is clear that the river was also used opportunistically by many different customers, for instance carrying musical instruments, ivory, cutlery, books, and a variety of personal goods. Even highly perishable foodstuffs not widely traded in the period appeared occasionally: eggs were carried on rare occasions, and bread was carried on a large scale in some years, such as 1704 when 10 downstream voyages carried 425 bags and about 11 tons[20]. Clearly, the Severn was a not a closed commodity route, but a public highway. There is no reason to believe that other navigable rivers should have been substantially different.

ii. Internal trade and the pre-industrial economy

The trade of the Severn serves not only as an example of the trade of a river navigation, but as a sidelight on internal trade and on the pre-industrial economy. This illuminates the characteristics of trade and the economy, and the ways in which they were changing in the period before the industrial revolution.

The large number and range of goods carried on the Severn has been discussed in relation to arguments about the diversity of river trade, but it also reflects the importance of internal trade more generally in supplying contemporary needs and in permitting marketing for productive activities. It is clear from the Port Books that a complex trading economy existed, and that the number and range of traded goods was growing. The goods that were recorded, and were being carried over long distances, include some which it might have been expected were produced and consumed only locally. For example, it has been shown that bread was carried in large quantities at certain times, and eggs could be carried though, as Chartres concluded, 'in general local and small scale transactions characterised the egg trades'[21]. Similarly, there was an appreciable trade in bottled beer by the beginning of the eighteenth century, well before the development of large-scale centralised breweries; and there were two-way trades in much agricultural produce, including crops grown ubiquitously like peas and oats.

Most importantly, many more manufactures and craft goods were carried more regularly than suggested by Chartres, who regarded them as only exceptionally reaching extensive markets, most crafts in particular being marketed close to home[22]. This shows that even in these sectors complex trading economies had developed. Craft goods carried regularly on the Severn in the early eighteenth century included candles, bellows, hats, bags, lanterns, apparel, wool cards, sadlery and chairs. It is apparent

from this that inter-regional markets existed for many goods, in order to supply areas where demand outstripped supply or because certain localities became specialist producers. In the case of lanterns, for example, it is clear that Bewdley was a leading centre of production, being in the early eighteenth century the place of origin of 95% of downstream shipments of lanterns and the destination for nearly all horn brought upstream for their manufacture[23]. On the other hand, some goods seem not to have been traded over long distances. For example, whilst wooden soles and leather were regular cargoes on the river, shoes were rare as goods of long-distance trade[24]. Bricks were carried on many voyages, but their total numbers were relatively small and there is reason to believe they were special types which justified long-distance trade, such as rubbers or firebricks.

There is plentiful evidence that the numbers and quantities of goods traded increased in the period. This came about as a result of three kinds of changes in the economy: the introduction of new processes and products, rising consumption owing to growing population and increasing incomes, and changing regional relations derived from increasing personal and geographical divisions of labour. An index of this growth is the increasing numbers of goods recorded in the Port Books. These increased from only 39 which appeared twice or more in 1637 to 174 in 1666, 215 in 1706 and 270 in 1722. The first increase probably reflects changes in the quality of recording, but the fact that more than half as many goods again were carried in 1722 as in 1666 probably reflects the true increase in numbers of goods traded. A small part of it was created by new goods and commodities which began to be consumed during the period, such as mineral waters from Bath and Hot Wells, clover seed and imported deal boards. A greater part of the increase derived from changing patterns of inter-regional trade, introducing articles of trade which had previously been locally made and consumed, like bendware and sacking, or raw materials which were needed where only part-processed or finished goods had previously been traded. Among the goods which appeared on the Severn for the first time in this period were copper and callamy, both going upstream from the 1690s for brass to be manufactured in the midlands rather than brought from producers outside the region[25].

The volume as well as the range of goods and commodities traded increased markedly during the period studied. This derived from rising consumption and from changing regional specialisms. Holderness wrote fifteen years ago, 'The volume of internal traffic in England increased greatly between 1500 and 1750 although we have no means of quantifying it'[26]. The evidence from the Port Books now does provide some means

of quantification. This is first of all apparent in the increasing numbers of voyages recorded. The total number of inward and outward voyages recorded grew from 267 in 1637 to 445 in 1666, 515 in 1684, and 678 in 1722 before falling with the decline in recording to only 237 by the end of the series in 1765. Even between 1666 and 1722, therefore there seems to have been a greater than 50% increase in numbers of voyages. With the increasing capacity of vessels the total volume of goods carried must have grown faster still. It is not possible to estimate the numbers of voyages there might have been by the end of the series, but individual commodities which were accurately recorded, and contemporary descriptions of trade, indicate strongly that overall trade was continuing to grow and perhaps accelerate[27]. Indeed, this was probably one of the reasons that the Port Books recorded progressively less traffic and were eventually abandoned. It is clear that Willan was seriously in error in asserting repeatedly from the Port Book evidence *nationally that there was a decline in trade after the 1720s*[28].

Individual trades reflected differing rates of growth, but many of them were startlingly rapid. Some of the growth was essentially related to increasing consumer demand, and might be slow compared with that related to major changes in production or regional specialism. Glass manufacture, for instance, was an old-established industry in the Stourbridge district and made a large contribution to downstream river trade early in the period. Chartres makes the point in a national context that the glass industry was unusual among manufactures from the sixteenth century in being concentrated in few centres from which trade spread wide[29]. By 1647 the Port Books already recorded 14 downstream shipments a year with glass. These had more than doubled to 35 by 1666 probably as a result of better recording, but after this growth was gradual: there were 51 voyages in 1697, 70 in 1705 and 90 in 1722. There is no doubt this growth would have continued despite the falling quality of recording. Even in an established industry trading over long distances, therefore, there was appreciable growth in the period studied. Growth in the grain trade was slower, presumably because demand was much more dependent upon the growth of population and had less elasticity. The total downstream trade in grain crops grew from around 60,000 bushels a year in the mid seventeenth century to between 70,000 and 110,000 in the early eighteenth century, depending upon the harvest. Other old-established trades grew much more rapidly. The numbers of chairs sent downstream, for example, grew from 132 in 1666 to around 1200 at the turn of the century and over 3,000 in 1722. This must have reflected increasing real incomes acting upon a product with reasonably elastic demand. Trade in tobacco grew even more spectacularly owing to its much higher elasticity of demand and the fact that smoking was an urgent fashion growing from a recent beginning. Upstream tobacco shipments recorded grew from 1,340 lbs in 1647 and only 24,000 lbs

even in the highly detailed book for 1656 to nearly 150,000 lbs in 1674, 654,000 lbs in 1697 and over 800,000 lbs in 1722, although there was great fluctuation in demand from year to year which seems to have been dependent upon levels of prosperity.

In other cases, rapid increases in the volume of trade seem to have been brought about by industrial changes. These were concerned with the materials and products of new industries, with improvements in productivity, and with shifts in regional specialisms. The outstanding example of change in an industry was salt, which saw a total reversal of trading patterns with the breaking of the Droitwich salt monopoly and consequent changes. Salt was carried upstream not down in the early seventeenth century, but downstream shipments grew from nothing to 70,000 bushels a year during the 1690s, 170,000 by 1722 and around 250,000 during the 1740s and 1750s. Salt was recorded in more detail than other goods in the period in the decline of the records and provides persuasive evidence that trade did indeed continue to grow. The brass-making industry showed similar patterns, as has already been mentioned, with upstream shipments of callamy and copper being needed for the first time from the end of the century. Another example of a substantial trade growing from almost nothing was the downstream shipment of pot clay, required by expanding metallurgical industries to make crucibles and furnaces. Shipments grew from nil recorded in the early seventeenth century to 7 in 1666, around 50 c1700 and 80 in 1722.

In many cases the changes in the volume and goods of trade were accompanied by changes in directions and geographical patterns. The shifts in inter-regional trade relations which have already been described were part of this: concerned with the reversal of the salt trade, the establishment of new industries and the development of greater regional specialisms. This can also be seen at an aggregate level in the numbers of voyages to and from different ports. Bristol was always the dominant port in the trade of Gloucester, always being the port of destination for over two thirds of outward voyages. However patterns of trade became more complicated during the period, with an increasing number of voyages to places other than Bristol, notably Bridgwater. The number of voyages from Gloucester to Bridgwater grew from about seven a year in the late seventeenth century to about 34 in the early eighteenth. The engine behind most these changes seems to have been the salt trade, the extraordinary development of which created a need for direct connections with the fishing coasts where salt was in greatest demand. However, this development also permitted other cargoes to be taken directly to the same ports, and created back-traffic. Upstream voyages also seem to have come more and more frequently from ports other than Bristol from the beginning of the eighteenth century.

The relative strength of home ports supplying vessels to the trade through Gloucester also seems to have changed. The most important feature of this, perhaps, was the steady growth in importance of Bewdley as trade developed with its industrial hinterland, making it the most important centre of the river trade. Other important features were the decline of ports on the upper river in terms of passage through Gloucester as mechanisms were established for more regular transshipment of goods, and the growth of influence of the transshipment ports themselves, such as Tewkesbury and Upton which provided vessels more readily capable of sailing to destinations other than Bristol or Chepstow. Such changes probably reflect the factors behind many shifts in trading relations within England and Wales during the pre-industrial period.

Changes also occurred in the organisation of trade, representing a modernisation of trading practices and capacities which, along with widening markets, was a vital enabler of the acceleration of economic activity. Although the numbers of merchants named in the Port Books each year seems to have remained fairly stable throughout the period at around one hundred, the increasing number of voyages recorded were brought about with an increasing number of voyages per merchant each year. Voyages per merchant per year grew from about two in the early seventeenth century to about six by the early eighteenth. This mean masks the fact that some merchants took on much larger numbers of voyages. Several trades were concentrated into fewer and more specialist hands. The tobacco trade became progressively concentrated with fewer merchants, and the leaders of the trade carried an ever higher proportion. The same was true of the salt trade. This must have had implications for the efficiency of trade in terms of economies of scale, skills in handling particular commodities and ability to purchase and market. In both the tobacco and salt trades of the Severn, the mean shipment carried on each voyage also increased appreciably, and this, too, must have had implications for the efficiency of transport. Such changes in organisation show that river transport and internal trade in general were capable of responding to the changing circumstances of the pre-industrial period and expanding to deal with new and more complex trades.

Everitt has said that 'every age is an age of change'[30], and this is certainly the case. However the changes which occurred in internal trade in the pre-industrial period seem to have been many and significant. It is clear that a wide range of goods could be and were transported over long distances to economic markets in the period. The conditions for considerable expansion in the industrial revolution were in place through the creation of new markets and the articulation of new sources of supply, and rapid re-organisation and growth were already underway in many spheres.

iii. Port Books and computer-aided study

The use of Port Books in the past has been limited by uncertainties over their interpretation and reliability, and by logistical problems of extracting and analysing information. This study has demonstrated that these difficulties can be overcome and the evidence contained in Port Books can be applied to a wide variety of historical investigations.

Whilst the Port Books did not record all traffic on the River Severn, or at any port where they were kept, they provide a fuller and more detailed account of internal trade in the pre-industrial period than any other source. Provided scholars recognise omissions of voyages and goods like those considered by Andrews, or others identified in this thesis, the evidence can be used effectively. Significant misinterpretations, such as Willan's concerning the apparent decline of trade in the mid eighteenth century, can be avoided if the frailties of the source are understood. Critical comprehension of the evidence is far more feasible with the application of computing than when Willan was working with purely manual methods.

Detailed study of the Gloucester coastal Port Books has shown that evidence derived from them can be coherent and can concord with findings from other sources. Examination of many commodity trades shows a remarkable consistency of the patterns revealed, which themselves prove to be consistent with factors known to have affected them. For example, the seasonality of the upstream tobacco trade recorded is consistent both from year to year and with the dates of markets held in Bristol. Longer-term fluctuations in the tobacco and the salt trades are consistent with the timing of events which would have affected them, such as wars, blockades and changes in supply. Comparison with other sources suggests a high proportion of trade was recorded. For example, an almost exact match existed between accounts of iron carried from Coalbrookdale to Bristol and related entries in the Port Books[31]. In the late 1720s, one third to half of all salt produced in Droitwich was recorded passing through Gloucester: the maximum amount that could be expected to be traded along that route. In 1697, upstream copper shipments recorded on the Severn represented such a high proportion of Houghton's estimate of total production that his own figure must be questioned[32]. Such circumstantial evidence all points to a high level of accuracy in the Gloucester Port Books, at least for some commodities. Though they have identifiable deficiencies, they are more complete than most other series of coastal Port Books[33], and provide a more valuable account of inland trade in the period than any other source.

The quality of the Gloucester books varied over time. The most accurate periods of recording were from the 1680s to the 1720s, and in the 1650s. The Coast

Books of the Commonwealth period are the fullest and most reliable, and it is unfortunate that so few have survived. Computerisation and detailed analysis of those remaining nationally would be a major contribution to further understanding of internal trade in the period. It is clear that the records declined rapidly from the 1720s, and most evidence for this period can only be used illustratively, to show that certain activities were taking place rather than to measure them. Even in this period, however, commodities such as coal, bricks and salt which were subject to domestic duties seem to have been recorded accurately until the 1760s.

Systematic analysis has also permitted better understanding of terms and concepts in the Port Books, such as the home ports of vessels, the roles of merchants and the compatibility of different terms for commodities. For example, it has been shown that for the Gloucester series at least the home port provides a valuable indication of the upstream location with which a boat was trading, and from or to which most of its cargo was being carried.

The greatest disincentive to the Port Books has also been overcome during this study: the difficulty of effectively manipulating the very large volume of data they contain. The development of an accurate and sensitive methods for comprehensively computerising the source revolutionises its potential. A system has been designed which can be applied to any series of coastal Port Books. The structure of the original source has been analysed to achieve the optimum data model, and ways have been devised to enter and check the data so as to minimise differences from the original source.

The continuing value of the database designed for this project is threefold. First, it will enable further research to be undertaken with relative ease into the Gloucester Port Books and their unique evidence for river trade. Second it will provide a database design and suggest fruitful avenues for research into other series of Port Books. Finally, it provides a case study of computerisation relevant to other historical sources. Challenges similar to those of the Port Books are provided by many sources for which computerisation can bring about a transformation of use. The methodology developed for improving the accessibility and applicability of Port Books emphasises the need for comprehensive approaches and accurate data item recognition, and highlights the benefits of working with large numbers of volunteer transcribers.

Attention has been paid in this study to the need for standardised methods of analysis and exact explanations of techniques used, for example to aggregate weights and measures, to classify ports, or to count voyages as opposed to entries. Attention to such minutiae is essential in modern quantitative history, especially in the age of computerisation and data exchange. The potential for comparative and consecutive

studies to build on one another's findings once large data sets are available is revolutionary in its implications; but this can only be realised if methods can be understood and replicated. This applies both to the detailed techniques of extracting and analysing data and to the wider question of finding the most fruitful ways of exploring the diversity of the subject matter. The development of rigorous means of analysing trade has never been tackled effectively by historians, and there are ontological challenges in, for example, assessing the diversity of goods, quantifying trade flows, or selecting indices which shed light on individual trades and broader economic issues. This thesis goes some way toward finding pathways by showing that Port Books can be used effectively, that the trades in particular goods can be quantified in detail, that certain ways of sorting and tabulating data have diagnostic value, and that many different issues can be explored.

Traditional impressionistic techniques are perhaps less time-consuming and more sensitive than those used here, as they permit a more instinctive choice of direction. However such techniques are less likely than the exploratory techniques used in this thesis, especially in the chapters on commodities in detail, to uncover previously unsuspected patterns or interpretations. They are also less likely to provide forms of data which can be replicated in other case studies, permitting comparison and aggregation to build towards a more broadly based understanding of topic or period. The incompatibility of case studies has dogged both historical understanding of trade and the development of local and regional history, for which the possibilities of comparison or aggregation of findings have been undermined by the diversity of techniques. Approaches such as those in this thesis enhance potential for 'nationalising' local history, or extrapolating from case studies, because they suggest structures of analysis which can be applied elsewhere and they provide machine-readable sources which can be re-used to explore new themes and compare with similar evidence anywhere in England and Wales.

The attempt to create a logical-positivist revolution in the social sciences during the 1960s and 1970s provided many dead ends[34]. The effort to quantify-all is bound to meet with limitations, and the potential for testing hypotheses and replicating 'experiments' will always be limited when dealing with historical sources and irregular human affairs. However, computer-aided study of sources such as Port Books provides ways of achieving the advantages of quantified methods and the comparability of case studies without the disadvantages of unduly constricting approaches and investigations: using computing methods as sharp tools in sensitive hands rather than as the 'machines gone mad' of the positivist paradigm[35]. This has been the first time that a comprehensive database of Port Books has been created. It is to be hoped that the

findings of this thesis and database itself can be compared and contrasted in future with evidence for many other ports.

The new application of computerisation to Port Books demonstrated opens up endless opportunities for the historian to investigate English internal trade. The database created of the Gloucester Port Books will be utilised to investigate many additional aspects of river navigation and of the economy of the Severn valley region. Internal trade was so deeply woven into the fabric of the pre-industrial economy that its better understanding can beneficially be enlarged in almost every direction with implications for subjects such as industrial development, agriculture, towns, regional economies, material culture, and other themes of concern.

It has been possible here only to develop methodology, address some central issues, and suggest directions for the future. At the end of the pre-industrial period, Tristram Shandy was struggling with a similar task, and his apology for the historian does as well now as it did then.

'...there are archives at every stage to be looked into, and rolls, records, documents, and endless genealogies, which justice ever and anon calls him back to stay the reading of:- In short, there is no end of it;- for my own part, I declare I have been at it these six weeks, making all the speed I possibly could,- and am not yet born:- I have just been able, and that's all, to tell you **when** it happened, but not **how**;- so that you see the thing is yet far from being *accomplished.*'[36]

APPENDIX

RULES FOR COMPILATION OF THE PORTBOOKS DATABASE

This appendix is a summary of the notes to transcription volunteers, edition 4, dated December 1986. This was the version of the transcription rules which was used by most volunteers. These rules have subsequently been expanded and updated, principally by David Hussey, to take into account variations between the Gloucester Port Books and others now being computerised as part of continuing research at Wolverhampton Polytechnic.

The System of Transcription

The coastal Port Books for Gloucester are gradually being transcribed onto the Wolverhampton Polytechnic mainframe computer in their entire series. In addition to staff and students at the Polytechnic, a growing number of volunteers have begun to transcribe information from the documents to computer data forms, and this is greatly increasing the rate at which the job is being completed. Since most volunteers are interested primarily in the details of boats from particular up-river ports, the system is for them to transcribe all those voyages from their own choice of port which appear in a given book. If volunteers are interested in commodities or traffic rather than individual ports, they are encouraged to transcribe complete books rather than select certain voyages from them. Copies of the books are circulated to volunteers in different areas until all the entries have been transcibed. A list of the ports for which entries have been completed for particular books is kept by the organisers to ensure work is not duplicated.

The information is transcribed from the books onto computer forms provided, each entry in the books having a separate form. An example is given at the back of these notes. When you have finished transcribing the entries which it has been agreed you will do, you should fill in one of the questionnaire forms provided to ensure that records are kept up to date and you are credited with your work. You can attach to this questionnaire a list of any queries arising where the documents are difficult to read, and a note of new abbreviations you have had to use.

Rules for transcription

A few general points need to be born in mind when transcribing information for subsequent typing into the computer database. The first of these is that information of the same type must always be entered in the same place on the form and in the same manner if it is to be found again. When the computer searches for information such as the voyages of a particular merchant, it does so by looking for the string of letters in his name in all the merchant surname and Christian name boxes or **fields** throughout the whole database. If his name has been accidentally placed in the master's name fields or elsewhere it cannot be retrieved when required.

The consistency of spelling words is also important. If spellings were entered into

the database which were inconsistent with the lists kept of all words and names used, the information could not be found again. A search of the commodity field for 'WOOLLEN CLOTH' for instance, would not find an entry which had been written wrongly 'WOOLEN CLOTH'. To avaoid this danger, we have installed a mechanism in our computer which automatically checks everyword typed in against the exisiting vocabulary which is permitted. If a word is misspelled it is rejected and the typists send the form concerned back to the organisers for checking. While this is an important job if the list of words contained in the database is to be kept up to date, it becomes very wasteful of time if a lot of misspellings have to be corrected. It is important, therefore, that writing should be clear (always in block capitals) and in pencil so that corrections can be made. Spaces between the words should be readily apparent to the typists. 'TIMBER STUFF', for example, would effectively be an incorrect spelling of 'TIMBERSTUFF'. You should also take care to distinguish between figures which the typists can misread, such as the letter 'O' and the number nought (this is conventionally done by crossing the number and leaving the letter intact), 1 and I, 2 and Z, 5 and S and 7 and Y.

If you are using abbreviations, as in the case of ports and possibly of Christian names and boats, you should be sure that they are always the same for the same word, but not the same for different words. The code lists need to be consulted regularly if mistakes are not to be made in this way: they are the easiest to make and most difficult to remedy. Some mistakes are unavoidable, and some can be corrected later, but accuracy, consistency and clarity are vital virtues when working with computers.

Occasionally, it is difficult to decipher the original entry from the xeroxes, and the accurate information cannot be put in its field. In these cases, put three crosses 'XXX'. This can be searched for at a later date and sometimes corrected from the originals at the Public Record Office. If you are confident enough to put something down on the form, but not completely sure about it, put a note on the separate queries form that it should be checked. In other cases, no information is given at all to put in a particular field, and you should mark this by putting '---'.

The Fields and their Contents

The following descriptions of the field contents on the transcription form should tell you everything you might need to know about how to tackle particular problems.

PRO Ref

It is vitally important for sorting that each entry should have a unique reference number. This is based on the classification at the Public Record Office within class E190. The first six figures, e.g. 1256/06, identify the actual volume. The next two, after the second slash, identify the individual folio (i.e. the leaf, front and back, or two pages as we would reckon them in a modern book), and the last two figures the entry on the folio. REMEMBER THAT THE COMPUTER NEEDS TELLING THERE IS A NOUGHT IN A BOX, DO NOT JUST LEAVE A BLANK. As an example, the reference to voyage number sixteen on folio eight of volume 1256/6 would be written 1256/06/08/16.

The volume number is to be found down the right hand edge of the front face of each folio; the folio number is usually in the top right hand corner of each folio, front face only.

I/O or Inward/outward
This gives information about whether the voyage is coming into or going out from Gloucester or the creeks of Berkeley and Newnham. In the original, this is not stated for each individual entry, but it is clear from the section of the book in which the entry appears. Enter I, not 1, for Inward (i.e. upriver) and O for Outward (i.e. downriver)

Coquet Date
Use modern dating - i.e. from 1 January to 25 March add one year, so 17 January 1655 becomes 17/01/1656. Note that the scribes sometimes use '8ber', '9ber', and '10ber' for October, November, and December. Use modern conventions - 08 means August, and 10 means October; decode 'iiity' as 30. If a second date is given for a particular entry, make sure that the one that goes in this box is that of the original coquet, and not a later day.

Boat
There are two ways in which boat names can be entered on the forms, according to the preference of individual volunteers. The first is to write the boat name in full, modernising the spelling of names in accordance with the list 'CODBOAT'. Each character should be written in a separate box of the boat field. If the boat has two names, like 'Thomas and Benjamin' (often abbreviated to 'Thos & Benj'), write them with spaces and a plus sign between them: 'THOMAS + BENJAMIN'.

The alternative method of entering boat names is to use standard abbreviations, which will save you and the typists time if you feel you can easily remember the shorter versions. You may wish to use the abbreviations for names which appear frequently and the full version for those which you are less familiar with. The abbreviations consist of standard three of five letter codes which are listed in the dictionary CODBOAT. The general rule is to use the initial letter plus the next two consonants, but there are a few variants to avoid duplication, e.g. Enid becomes ENI to avoid confusion with Endeavour END. Some boats have compound names: the first name goes in the box for three letters in the ordinary way, then ignore 'and', 'of' etc., and use the initial letter plus the following consonant, e.g. Royal Oak, RYLOK; Samuel and Sarah, SMLSR; for triple names treat the first word normally then use the initials, e.g. New Royal Oak, NEWRO. Again some variants have to be used to avoid duplication thus John and Mary, JHNMR, but John and Margaret, JHNMG. The coding is nearly self- consistent, and easy to use with a little practice so that the codelists seem unnecessary. That is the time when a wrong coding creeps in so easily; we have in the past confused Enid and Endeavour above, for instance.

If you have to assign a new code, follow the rules given here as far as possible, but make sure your code is not a duplicate of that for another boat. Make a note of the code you have assigned and its meaning on the special forms provided for new codes, so that the organisers can add them to the lists as soon as possible. For extra safety, note the name beside the code on the transcription form also.

Port
Ports and towns are written in abbreviated forms. Codes are three letters only for towns, but are allocated by the same method as boat names, above, i.e. the first letter and the next two consonants of the modern spelling, unless this causes duplication. CODTOWN gives a list of codes. If you have to assign a new code let the organisers

know by writing it on the new codes forms. Put '---' if you are working on one of the later books which does not give ports of origin.

Merchant's Christian Name
The merchant almost invariably appears first in the Gloucester books, but you should check that this is the case by seeing that the entry says 'Mer', 'Merch', 'Mercht', 'Mt'etc or 'Ind' for indenturer after the full name. Christian names are abbreviated similarly to boats and ports, with three letters. Codes are given in CODCHRIS.

Merchant's Surname
This should be spelled exactly as given in the original. Resist the temptation to standardise spelling. This can be done for sorting purposes by the computer without altering the original. If the merchant is denoted 'sen' or 'jun' leave a single square and put 'S' or 'J' respectively in the next square, e.g. 'OAKES J'. If the name is a company, for example 'Wallington and Co', write 'WALLINGTON +CO'. Similarly, if the name is 'Pennington and Son', write 'PENNINGTON +SON'. In a few books the merchant's occupation and town of residence are stated. These are noted in the Miscellanea field (see below).

Master's Christian Name
This should be entered in exactly the same way as the Merchant's Christian name, above. Very occasionally, the master comes before the merchant in the original records, so be sure you are entering each in the right field. You can check this by making sure that the full name is followed by 'Master', 'Mast', 'Ma', 'Mter', though in some cases the abbreviations used make this difficult. Where the master and merchant are the same do not enter 'himself' or 'he' as the port books often do but enter the full name twice. If you do not, a list of all the masters produced by the computer will either have a lot of blanks, as though many voyages had had no merchant at all, or a very long entry under 'himself', which is not very informative! To note the fact that you have made this artificial alteration to the information, write 'HIM' in the Miscellanea field (see below). This enables separation of cases where it is possible the merchant and master were different people with the same name. These are quite possible in merchant families who made continuous use of the same Christian name, such as the Beales of Bewdley who had a John in every generation.

Master's Surname
See Merchant's Surname and Master's Christian Name above.

From
This box should contain the name of the port of departure for a voyage. The three letter town codes should be used (see Port above), and these should be written consecutively where more than one port is mentioned. For outward voyages the port will be 'GLC' (or 'NWN' or 'BRK' in the Newnham and Berkeley outward sections). For inward voyages the port is specifically stated in each original entry, either in the margin or at the end, where it will say 'from Bristol' or 'coquet dated at Chepstow ...' etc. Check for consistency between the O/I and the from and to boxes, as this is a common place for errors. If you have entered O correctly the journey must ALWAYS go from Gloucester, Newnham, or Berkeley, and if I it will ALWAYS be going to one

of those places.

To
These should be coded as in 'From', above. For outward voyages the port is given in the entry. For inward voyages it will be 'GLC', 'NWN' or 'BRK'.

Margin
This field should contain a one-letter code to indicate the type of note which often appears in the margins next to particular entries in the port books. These seem to have served the purpose of recording that certifications had been received for outward traffic or that endorsed coquets or certificates had been sent out from Gloucester for inward traffic. We don't know the significance of this at present, but the marginal marks do not always appear, and their pattern may be worth analysing at a later date. The most frequently occurring marginal marks and the codes for them are given below. If one does not appear, you should note this positively by writing the letter 'O'.

Certificate, Certified, Cert, Cer	'C'
Returned, Ret, R	'R'
Granted, Gr	'G'
Nothing written	'O'
Illegible	'X'

Very occasionally it will be indicated in the margin that a journey was made not by coquet but per transire, warrant, sufferance or let pass: all subtly different types of custom arrangement. These too should be noted by a code in this field, as shown below. If two marginal marks appear next to a particular entry, use the second square of the field.

Let Pass	'L'
per Transire	'T'
Sufferance	'S'
Warrant	'W'

Please let the organisers know if you come across a marginal mark of this sort which has not already been given a code.

Other Date
In a few port books dates appear for every entry in addition to the date of the coquet concerned. These should be noted in the same way as Date above. In the exceptional event of more than two dates being given, write the second date in this field and the third in the Miscellanea field (below), in the form, 'OTHDATE 07/09/1636'.

Other Christian Name and Other Surname
In a very few books several individuals are named in addition to the merchant and master, often in the margin or at the end of the entry. These names should be written in the OthChris and OtherSurname fields in exactly the same way as the merchants' and masters' names above. If the names exceed in number the two extra spaces

supplied on the form, write them in the space below with a note of what they are.

Miscellanea

This field contains various pieces of irregular information which cannot be incorporated in the other fields. This information may consist of a quotation direct from the manuscript in some instances, for example, 'SUNK WITH ALL HANDS DROWNED', or with slight adaptation, for example in relating special information about the status in customs of a particular item of the cargo, 'EARTHENWARE BY LICENCE DATED 07/03/1720', where the original reference may have mentioned as part of the cargo description, 'two hogsheads earthenware by licence dated 7th March 1719'.

Several classes of more standard information may be placed in this field in addition to those above. Care should be taken always to ensure that these pieces of information are inserted when they apply to a particular voyage.

1. Where the master and merchant are specifically stated as being the same person (see Master's Christian name above), enter 'HIM'.
2. In the few early portbooks where the burthen tonnage of the vessel is given for each voyage, this should be entered as for example 'BURTHEN 30 TON'.
3. Where the merchant of the voyage has his occupation and/or place of residence stated, as in some of the early books, this should be entered 'MERCHANT = MERCER OF WORCESTER' for example, or 'MERCHANT = OF NEWPORT'. If an occupation or place is given for someone other than the merchant, this should be noted in the same fashion 'MASTER = OF GLOUCESTER' or 'OTHER = PLUMBER OF DERBY'.
4. The most regularly occurring and most important miscellaneous notes are those relating to wool coquets. Since wool was usually given a separate coquet and entry in the port books from the rest of the cargo carried with it, we need to be able to associate the two references in the computer. This is very useful, for instance, in counting voyages over a particular period, when one wishes to exclude what are effectively second coquets for the same voyage. Where you find a cargo which is carrying wool, and nothing else, look to see if one of the nearby entries is for the same boat and master going on the same journey on the same day. If this is the case you should make a note to this effect in the Miscellanea field of BOTH forms. On the form relating to the wool coquet itself you should write the word 'REST' and the folio and entry number of the form on which the remainder of the cargo can be found, for example 'REST 09/12'. On the form relating to the main cargo you should write the word 'WOOL' and the folio and entry number of the form on which the associated wool cargo is written, for example 'WOOL 09/10'.

Check

This field is to indicate when a record is completed without omissions due to illegibility and has been checked for accuracy by someone other than the person who transcribed it. This will eventually be filled with a 'C' to confirm it has been checked at the Polytechnic, though this close checking is likely to be a slow process. In normal circumstances, this field would be filled in only at the Polytechnic, but if you work in a group which has transcribers checking one another's work, you may feel confident enough to fill in the 'C' yourself on those forms which have been checked.

This field is also used in exceptional cases where it seems wise to provide

information about a voyage which is not actually given in the manuscripts. In the case of voyages after 1725, for instance, when the port of origin of boats was no longer given, it may prove desirable to extract this information for the up-river voyages from Bristol from the Bristol Port Books and to put it in the appropriate field in the database. In this instance, however, it will be necessary to point out that the record is not as in the original manuscript. This is done by putting an asterisk after the first square of the field and then an explanation of what has been done, for example: 'C*PORT DERIVED FROM BRISTOL BOOK 1156/09/04/12'. The field could also be used in instances where what seems a mistake in the manuscripts has been corrected, but there was still some doubt about the intended meaning.

Cargoes

The descriptions of cargoes given in the port books are exceptionally detailed and of immense historical value, but sometimes require a little juggling to be reorganised into a format standard enough for the computer to manipulate successfully. In addition to the explanation of this reorganisation given here, several examples of the types of rearrangement which are necessary are given on a sample form at the back of the notes. The format consists of having one line on the form for each separable item of cargo, and four fields in each line containing, respectively, the quantity of the goods concerned, the measure or unit used to describe them, a description of the type of goods or commodity itself, and finally occasional subsidiary information, for example about the way the goods are packed, their origin, or the fact that they are being returned unused. This fourth field does not in fact appear as a column on the form, since it is needed only infrequently; it is instead notified by writing a semi- colon at the end of the third field to indicate to the typists that further information belongs in the next field. No coding is used for the cargoes, but a few abbreviations are employed for ease of transcription and standard forms are prescribed. The standard forms of units of measurement are given in the list CODUNITS and the standard forms of commodities in CODCOMOD. Generally, there is very little alteration of the original record except in modernising spelling. The contents of the cargo fields should be as follow.

Quantity

This field contains the numerals used to describe the commodity. These should all be in the form of arabic numerals, so modernise Roman numerals, and convert from word numbers. Fractions should be expressed as decimals - by far the most usual of which is 1/2, which should be written as '.5'. Take care when decimalizing that you are converting a number and not a word for a container such as a half hoghshead or a half case: '6 half hogsheads' should be written as '6 | HALFHHD', while '6 and a half hogsheads' or '6 1/2 hogsheads' should be written as '6.5 | HHD'. In most instances it is incorrect to translate words such as dozen and gross into numbers, since these, like the Baker's dozen, were not always equal to 12 or 144. Instead, '1 dozen chairs' should be written in the three cargo fields as '1 | DOZ | CHAIRS'. Only convert such words to numbers if there is a second one, which makes the intended meaning more likely to have been the standard one, for example converting 'three dozen gross of pipes' to '36 | GROSS | PIPES'. More judgement needs to be used in interpreting the words 'hund' or 'C', which may refer to 100 or to 1 CWT, or to some other measure. In these instances our rule is to follow the original and put 'HUND' or 'C' in the

measure field, unless it is clear that a number was intended, as in the example '2C bundles iron bars', which is likely to mean '200 | BUNDLE | IRON BARS'.

Measure

This field contains the name of the unit used to describe the cargo, such as ton, hogshead, barrel, tierce, runlet, wey, etc, and sometimes a word such as dozen or gross (see Quantity above). The forms of such measures or units is standardised to the **singular form** and most modern spelling, with a few abbreviations used for the most commonly occurring and longer words such as kilderkin 'KK', rundlet 'RT' and hogshead 'HHD'. These are always compounded into one word if an adjective is present along with the noun, so that half hogshead, for example, becomes 'HALFHHD', and small cask becomes 'SMALLCASK'. A list of all the standard forms used is given in the list CODUNITS. If you find a word which is not on this list, write it in its most modern form and send a note of it to the organisers to add to the lists. In a few instances the unit of measurement is more precisely described **after** the commodity, for example '3 chalders coals London measure' and '23 tods of wool at 28lb per tod'. These should be written as '3 | CHLM | COALS' and '23 | TOD28 | WOOL'. Care should be taken in interpreting words such as dozen and gross and also 'C' and 'hund' (see Measure above). Take care as well over the transcription of 'pounds' where it relates to money. In other cases the word is transcribed as 'LB', but it is not clear in this instance whether weight or value is meant, and the word 'POUND' should be used unless the record literally says 'pounds **in** money', in which case 'LSD' may be written. If there is no applicable unit of measure because the item of cargo is an object or many objects, use the word 'OF', e.g. '1 | OF | COPPER STILLS' or '2000 | OF | BRICKS'. These conventions are given in CODUNITS.

Where several units and quantities are given for the same item, these should be separated out into more than one line of cargo. '2 hogsheads 3 barrels spanish wine' should thus be written as '2 | HHD | SPANISH WINE', followed on the next line by '3 | BRL | SPANISH WINE'. Occasionally it is necessary to put two units of measurement in the same line of cargo description, in which case a '+' should be placed between them, so that 'ten packs and trusses of linen' reads '10 | PACK + TRUSS | LINEN'.

If several measures are given but a more standard alternative is given, you should put the latter in this field and note the detail about the containers after the Commodity field (see below). This is invariably the case with tobacco; for example, 'eight hogsheads one cask tobacco quantity four thousand three hundred thirty eight pounds' should be transcribed '4338 | LB | TOBACCO; 8 HHD 1 CASK'. Another common example of the need for this sort of reversal of the textual order is wool, which is described in its packages of various sorts, but also given an equivalent in tods of 28lb ('TOD28'). In some of the later books, wool is given in packs but also in the three measures, hundredweight, quarters and pounds. In this instance, you have to write, for example, '11 | PACK | WOOL; 23 CWT 1 QR 7 LB'. Be especially careful with entries like this to make it clear to the typists that there are spaces between each number and word of the further measures.

Commodity

The last field contains the name of the commodity being carried, along with subsidiary information about packing, and some more miscellaneous information.

Standard forms are used for the commodities which consist of modernised spelling but no other alteration, i.e. write 'led oare' or 'Lede or' as 'LEAD ORE'. Never leave out words even if you think they are unnecessary, i.e. write STONE COAL and SEA COAL, distinguish COAL from COALS and be very careful to differentiate between CHARCOAL and other similar entries like CHARD COAL which may mean coke. (In fact coal is something of a minefield!) Never normalize WOOLLEN to WOOL. Abbreviations are used only for the more common and longer terms. Anything described as English, for instance, is preceded by the letter 'E' and a space, and British by 'B' and a space; Kidderminster Stuff is abbreviated to 'KID STUFF' and Manchester Ware to 'MAN WARE'. The standard forms are listed in CODCOMOD.

If more than one commodity is described in terms of a single measure, or measures that cannot be definitely assigned to one commodity or another, both are written in the Commodity field separated by a '+'. Thus 'six barrels of cider and perry' will become '6 | BRL | CIDER + PERRY' and 'three barrels two casks cider and perry' will become '3 | BRL | CIDER + PERRY' followed by '2 | CASK | CIDER + PERRY' on the next line. If equivalents are given which are more standard than the first stated quantities (as in the examples of tobacco and wool given under Measure above), use those instead. Put the first stated quantities, which give useful information about packing, after the commodity itself and a semi-colon to indicate that it really belongs in the fourth cargo field. Separate the different numbers and words only with spaces; for example '7 packs one truss English Wool qt 64 todd at Twenty-eight pounds p tod' should be written '64 | TOD28 | E WOOL; 7 PACK 1 TRUSS'. Occasionally, it is said that a particular cargo was being returned (because it was faulty), and this should be noted by putting the letter 'R' after the semi-coon in the same way, indicating that it belongs in the fourth cargo field. When additional information is given about the dutiable status of the commodity, or where it is going or coming from, put this in the Miscellanea field (see above) because it is of more general interest than it relation to the item of cargo itself, but notify that there is some further information of this sort by putting after the commodity a semi-colon and space and then the word 'MISC'.

NOTES

Notes to the Introduction

(1) Braudel, *Wheels of commerce*, p. 25.

(2) Beard, C., *The Industrial Revolution* (1901), quoted in Flinn, *Origins of the Industrial Revolution*, p. 3.

(3) Mantoux, *Industrial Revolution*; Gras, *Industrial evolution*; Nef, 'Progress of technology'; Ashton, *Industrial Revolution.* Surveys of some of this literature and other contributions are made by Flinn *Origins of the Industrial Revolution*, pp. 2-6, and Hartwell, *Causes of the Industrial Revolution*, pp. 3-6.

(4) For example, Fisher, 'Company organisation' and 'London's export trade'; Chambers, 'Vale of Trent',

(5) Clapham, *Economic history of Britain to 1750*, p. 193; Wilson, *England's apprenticeship.*

(6) Thirsk, *Policy and projects*; Jack, *Trade and Industry*; Wrigley 'London's importance'.

(7) Notably those studying commercial evolution, capital formation, the rise of the consumer market and domestic industry: for example, Braudel, *The Wheels of Commerce*; Mendel 'Proto-industrialisation'; Hey, 'Rural Metal Workers'; Weatherill, *Consumer behaviour.*

(8) Hill, *Reformation to Industrial Revolution*; Thompson, *Dynamics of the Industrial Revolution*; and concerning more specific sectors of production, Nef, *Coal Industry*; Hamilton, *English Brass and Copper Industries*; Kerridge, *Agricultural Revolution.*

(9) Ramsey, *Tudor economic problems*; Holderness, *Pre-industrial England.*

(10) Deane and Cole, *British Economic Growth*, p. 280; Crafts, 'British economic growth', however, revises downwards Deane and Cole's views of the rate of growth between 1780 and 1831.

(11) Hudson, *Regions and industries.*

(12) Wrigley and Schofield, *Population History of England and Wales*; Chambers, 'Vale of Trent'; Levine, *Family formation*; Hey, 'Rural metalworkers'; Skipp, *Crisis and development.*

(13) Borsay, *English urban renaissance*; Clark and Slack, *English towns in transition.*

(14) Kerridge, *Agricultural revolution*; John, 'English agricultural improvement'.

(15) Kerridge, *Agricultural Revolution.*

(16) Minchinton, *English Overseas Trade*, pp. 15-16.

(17) Thompson, *Dynamics of the Industrial Revolution.*

(18) Flinn, *Origins*, pp. 11-13; Crafts, 'British economic growth'; Ashton, *Economic fluctuations*, p. 139.

(19) For example in judging the consumer goods which best denote industrialisation: see Weatherill, *Consumer behaviour.*

(20) For example in assessing whether innovations in the woollen industry were more crucial in industrialisation than innovations in cotton, which were applied sooner but affected a far smaller proportion of the working population.

(21) Nef, 'Industrial Revolution reconsidered'.

(22) Rostow, *Stages of Economic Growth.*

(23) Berg, *Manufactures*;

(24) Hudson, *Regions and industries*; Hey, 'Rural Metal Workers'; Rowlands, *Masters and Men*; Thirsk *Policy and Projects*; Langton *Regional Transformation.*

(25) For example Holderness, *Pre-industrial England* uses the term for the years 1500-1750; Coleman and John, eds., *Trade, Government and economy in pre-industrial England* covers a similar period, as do Clarkson, *Pre-industrial economy* and Chambers, *Population, economy and society in pre-industrial England.*

(26) For example, Clark, *Early modern Europe, from about 1450 to about 1720.*

(27) The Society for Post-Medieval Archaeology regards its remit as the period 'from the end of the middle ages to the onset of

industrialisation'.

(28) For example Persson, *Pre-industrial economic growth*, reaches back to pre-history, and Cipolla, *Before the Industrial Revolution*, p. 5 and elsewhere uses the term to refer a period from 1000 to 1700.

(29) Mendel, *Proto-industrialisation*.

(30) Wilson, 'Economic and politics in the seventeenth century'.

(31) Wilson, *England's apprenticeship*, pp. xi-xiv.

(32) Hill, *Reformation to Industrial Revolution*, pp. 155, 169, 181.

(33) Most of the following section is derived from Wrigley and Schofield, *Population History of England and Wales*.

(34) This has been most effectively demonstrated through regional studies of industrialising areas, for example Levine, *Family formation*; Hey, 'Rural metalworkers'; Chambers, 'Vale of Trent'; Skipp, *Crisis and development*, as well as by Wrigley and Schofield, *Population history*.

(35) Smith, 'Population and its geography in England 1500-1730'; Chambers, 'Vale of Trent'; Levine, *Family formation*; Hey, 'Rural metalworkers'; Skipp, *Crisis and development*.

(36) Borsay, *English urban renaissance*, p. 200.

(37) Clark, *Transformation of English provincial towns*, p. 13.

(38) Wrigley, 'Simple model of London's importance'; Fisher, 'London as a centre of conspicuous consumption'.

(39) Chalklin, *Provincial towns of Georgian England*, pp. 18-20.

(40) Clark and Slack, *English towns in transition*, p. 83; Prince, 'England c1800', p. 459.

(41) Large, 'Urban growth and agricultural change in the West Midlands', pp. 169-71.

(42) Clark, *Transformation of English provincial towns*, pp. 13-30; Chalklin, *Provincial towns of Georgian England*, passim; Borsay, *English urban renaissance*.

(43) Bolton, *Medieval English economy*, p. 152.

(44) Clay, *Economic expansion*, vol. I, p. 168.

(45) Holderness, *Pre-industrial England*, pp. 2-4.

(46) The custom of 'sail time' in Lancashire at least involved the hiring in of additional labour at mines to clear the winter coal stocks, apparently when the roads were enough improved after the winter: Langton, *Geographical change and industrial revolution*, pp. 45-6. This was also true of the carriage of coal on upstream on the River Tone in Somerset in the eighteenth century: Wakelin, 'Trade on the River Tone', pp. 26-7.

(47) Hoskins, 'Harvest fluctuations 1620-1759'.

(48) Lamb, *Climate, history and the modern world*, pp. 201-251.

(49) Lamb, *Climate, history and the modern world*, p. 221.

(50) Wilson, 'Transport dues', pp. 110-123.

(51) Lamb, *Climate, history and the modern world*, pp. 208-9.

(52) Jones, Porter and Turner, *Urban Fire Disasters*.

(53) Ashton, *Economic fluctuations*, pp. 118-21.

(54) The effects of war with the French on sugar prices and the amount stocked by a Shropshire mercer in 1694-5 provide an interesting example. The inventory of Joshua Johnson, mercer, shows he had a tiny amount of sugar in stock at this date, although he was a leading mercer and his peers who died shortly before or after had large stocks. Beveridge's prices show a marked rise at this date. Trinder and Cox, *Yeomen and colliers*, p. 41.

(55) Ashton, *Economic fluctuations*, pp. 49-83.

(56) Marshall, J.D. (ed.), *The Autobiography of William Stout of Lancaster, 1665-1752* (1967), quoted in Thirsk and Cooper, *Economic Documents*, pp. 100-2.

(57) Minchinton, *English Overseas Trade*, p. 10.

(58) Minchinton, *English Overseas Trade*, pp. 13-14.

(59) See the discussion below of the tobacco trade in that year.

(60) Jones, *Agriculture and economic growth*, chapter 1.

(61) John, 'Grain exports'.

(62) For the period in question, Volumes IV and V, edited by Thirsk.

(63) Pawson, *Early industrial revolution*, pp. 53-5.

(64) Kerridge, *Agricultural Revolution.*

(65) Jones, *Agriculture and Economic Growth.*

(66) Mingay, *Agricultural Revolution.*

(67) Thompson, *Dynamics of the industrial revolution*, chapter 3, makes this point eloquently.

(68) Chartres, 'Marketing of agricultural produce in metropolitan western England';Chartres, ed., *Agricultural markets and trade*

(69) Fisher, 'London food market'; McGrath, 'Marketing of food, fodder and livestock in the London area'; Stern, 'Cheese shipped coastwise'.

(70) Chartres, ed., *Agricultural markets and trade*, pp. 210-16.

(71) Chartres, ed., *Agricultural markets and trade*

(72) Coleman, *Industry in Tudor and Stuart England*; Holderness, *Pre-industrial England*, pp. 83-115.

(73) Riden, 'Output of the British iron industry'.

(74) Nef, *Coal industry*; Flinn, *History of the British coal industry.*

(75) Johnson, 'Charcoal iron industry in the early eighteenth century'; Hyde, *Technological change and the British iron industry.*

(76) Phelps-Brown and Hopkins, 'Seven centuries of prices of consumables'.

(77) Outhwaite, *Inflation in Tudor and Stuart England*, chapter 1.

(78) Holderness, *Pre-industrial England*, pp. 7-9; Ashton, *Economic fluctuations*, p. 181.

(79) Thirsk, *Economic policy and projects.*

(80) For example, Trinder, 'La vie d'un region'; Trinder and Cox, *Yeomen and Colliers*, esp. pp. 113-15; Moore, *Goods and chattels*; and most notably, Weatherill, *Consumer behaviour.*

(81) Spufford, *Great reclothing*, p. 3.

(82) McKendrick, Brewer and Plumb, *The birth of a consumer society.*

(83) Spufford, *Great reclothing*, pp. 3-4.

(84) Rowlands, *Masters and men*, p. 134.

(85) Sellman, *Atlas of modern history*, p. 5.

(86) Davies, *English overseas trade*, ch. 5.

(87) Minchinton, *English overseas trade*, pp. 1, 5-7.

(88) Davies, *English overseas trade*, chapter 3.

(89) Holderness, *Pre-industrial England*, pp. 136-9.

(90) Ramsay, *English overseas trade*, p. 240.

(91) Hinton, *The Eastlands trade and the Commonweal*, pp. 7-15.

(92) Davies, *English overseas trade*, ch. 6; Holderness, *Pre-industrial England*, pp. 133-6.

(93) Clay, *Economic expansion*, vol. II, pp. 193-200.

(94) Cockerell and Green, *British insurance business*, pp. 4-6.

(95) Cockerell and Green, *British insurance business*, pp. 18-20.

(96) Chartres, *Internal trade*, p. 64.

(97) Wilson, *England's apprenticeship*, p. 331.

(98) Defoe described bills and other forms of payment for merchants in detail in *Complete English tradesman*, pp. 349-68.

(99) Westerfield, *Middlemen in English business*, pp. 124-9.

(100) Chartres, *Internal trade*, p. 57.

(101) Berger, 'Development of retail trade'; Willan, *The inland trade*, pp. 76-106.

(102) Spufford, *Great re-clothing*; Chartres, *Internal trade*, p. 49; Hey, *Packmen*, pp. 195-204.

(103) Hey, *Packmen*, pp. 195-224.

(104) Pawson, *Early industrial revolution*, p. 141.

(105) Gerhold, 'London carrying trade', pp. 408-9.

(106) Lewis, *Early wooden railways*.

(107) Willan, *River navigation*, p. 133 and figures 1 and 3.

(108) Willan, *Coasting trade*.

(109) Chartres, *Internal trade*, pp. 44-5.

(110) Ville, 'Total factor productivity'.

(111) Mendels, 'Proto-industrialisation'; Hudson, *Regions and industries*; Thirsk, 'Industries in the countryside'; Coleman, 'A concept too many'; Clarkson, *Proto-industrialisation*.

(112) Burt, 'Diffusion of technology'; Gras, *Industrial evolution*; Hyde, *Technological change*; Nef, 'Progress of technology'; Trinder, *Industrial revolution in Shropshire*

(113) Chartres, 'Marketing of agricultural produce'; Everitt, 'Marketing of agricultural produce'; Jackson, 'Growth and deceleration in English agriculture'; Thirsk, *Policy and projects*.

(114) Chalklin, *Provincial towns*; Clark and Slack, *Crisis and order*; Clark, *Transformation of English provincial towns*; Corfield, *Impact of English towns*; Goose, 'Towns and the English economy'.

(115) Mendel, 'Proto-industrialisation'; Hudson, *Regions and industries*; Corfield, *Impact of English towns*; Langton, 'Regional geography of England'; Freeman, 'Regional geography of England'; Langton and Morris, *Atlas of industrialising Britain*.

(116) Spufford, *Great re-clothing*; Thirsk, *Policy and projects*; Weatherill, *Consumer behaviour*.

(117) Aldcroft and Freeman, *Transport in the industrial revolution*; Hey, *Packmen*; Pawson, *Transport and economy*.

(118) Chartres, *Internal trade*, especially pp. 9-12.

(119) There were many examples, such as the Lowthers of Whitehaven in Beckett, *Coal and tobacco*, and the merchants of Bristol in McGrath, *The Merchant Venturers of Bristol*, as well as very many more concentrated in the capital.

(120) David Macpherson, quoted in Ashton, *Eighteenth century*, p. 63.

(121) For example, Clay, *England 1500-1700*, gives a similar amount of space to foreign trade on the one hand and to the whole of English industry, manufacturing and marketing on the other, without any section specifically on the development of internal trade. Holderness, *Pre-industrial England*, gives 23 pages to a discussion of overseas trade and 7 to internal.

(122) Thirsk, *Policy and projects*, pp. 2-3.

(123) Chartres, *Internal Trade*, p. 11.

(124) Wrigley and Schofield, *Population history of England*; other important books concerned with English population in the period have included Chambers, *Population, economy and society*; Flinn, *Population growth*; Wrigley, *Introduction to English historical demography*; Levine, *Family formation*; and Glass and Eversley, *Population in history*.

(125) Thirsk, *Agrarian history of England and Wales*, volumes IV and V; other major works on the subject are referenced above in the discussion of agricultural development in the period.

(126) Ashton, *Economic fluctuations*, p. 139.

(127) Westerfield, *Middlemen in English business*, p. 123.

(128) Willan, *The Inland Trade* is, in fact, a collection of essays on several subjects rather than a comprehensive overview.

(129) Pratt, *Inland transport and communication*; Jackman, *Development of transport*; Aldcroft and Freeman, *Transport in the industrial revolution*; Barker and Savage, *Economic history of transport in Britain*; Bagwell, *Transport revolution*; Dyos and Aldcroft, *British transport*.

(130) Lewis, *Early wooden railways*.

(131) Pawson, *Transport and economy*; Albert, *Turnpike road system in England*.

(132) Chartres, 'Road carrying in England'; Turnbull, 'Provincial road carrying'; Gerhold, 'London carrying trade'. See also the critique of Chartres by Wilson, 'Land carriage in the seventeenth century'. Patterns of trade are addressed, but after the period in question, by Freeman, 'Transporting methods in the British cotton industry' and 'Road transport in the English industrial revolution'.

(133) Alsop, 'River Nene'; Barker, 'Sankey navigation'; Cohne, 'Non-tidal Wye'; Course, *Itchen Navigation*; Cross, 'Salisbury Avon'; Denton and Lewis, 'River Tern'; Duckham, *Yorkshire Ouse*; Duckham, *Inland waterways of east Yorkshire*; Hopkinson, 'South Yorkshire and north Derbyshire'; MacMahon, 'Beverley and its beck'; Sharman, 'Sandys and the Warwickshire Avon'; Summers, *Great Ouse*; Tann, 'Yorkshire Foss'; Thacker, *Thames highway*; Unwin, 'Aire and Calder'; Willan, 'Great Ouse'; Willan, 'Bath and the Avon'; Willan, 'Chester and the Dee'; Willan, 'Witham to the Yare'; Willan, 'Salisbury and the Avon'; Willan, 'Weaver'; Willan, 'Yorkshire river navigation'; Willan, *Don navigation*.

(134) Beckwith, *Gainsborough*; Wakelin, 'River Tone'; Wanklyn, 'Shrewsbury boats'; Jones, 'Lea valley'.

(135) For example, Dyos and Aldcroft, *British transport*, pp. 43-5; Duckham, 'Canal and river navigations', pp. 128-35; Willan, *River navigation*, pp. 1-2, 123-6.

(136) Davies, *English shipping industry*.

(137) Willan, *Coasting*, pp. 11-33.

(138) Deane, *First industrial revolution*, p. 77.

(139) Armstrong and Bagwell, 'Coastal shipping', p. 144.

(140) Davis, *Hull*; Jackson, *Hull*.

(141) Hinton, *Boston*.

(142) Metters, 'Rulers and merchants'; Williams, 'East Anglian ports'.

(143) Andrews, 'Customs ports of Sussex', 'Chichester and the grain trade', 'Thanet seaports', 'Faversham'; Chalklin, *Seventeenth-*

century Kent; Farrant, 'Seaborne trade of Sussex'.

(144) Wiggs, 'Seaborne trade of Southampton'.

(145) Clark, *Port of the Exe estuary*; Hoskins, *Exeter*; Stephens, *Seventeenth-century Exeter*.

(146) Stephens, 'Plymouth and the Cornish ports'.

(147) Minchinton, *Port of Bristol in the eighteenth century*, *Trade of Bristol in the eighteenth century*.

(148) Willan, 'Navigation and trade of the Severn valley'.

(149) Lewis, *Welsh Port Books*; George, 'Pembrokeshire sea-trading'.

(150) Woodward, *Elizabethan Chester*.

(151) Metters, 'Rulers and merchants'.

(152) Gras, *English corn market*; Nef, *Coal industry*.

(153) Weatherill, 'Growth of the pottery industry'.

(154) Burt, 'Lead production'.

(155) Stephens, 'Cloth exports'.

(156) McGrath, 'Marketing of food'.

(157) Woodward, 'Swords into ploughshares'.

(158) Wilson, 'Transport dues'.

(159) Chalklin, *Seventeenth-century Kent*; Hoskins, *Devon*; Jackson, *Eighteenth-century Hull*.

(160) Nef, *Coal industry*.

(161) Everitt, 'Marketing of agricultural produce'; Chartres, 'Marketing of agricultural produce'; Ashton, *Iron and steel*; Kerridge, *Textiles*.

(162) Chartres, *Internal Trade*, pp. 9-10.

(163) Quotations from Defoe seem to be the most persuasive evidence used by many economic history textbooks when discussing internal trade. The reliance on literary evidence for roads in particular is attacked by Chartres, 'Road carrying in England', who is rebuffed by Wilson, 'Land carriage'.

(164) Chartres, *Internal Trade*, p. 13.

(165) This derives from Willan, *River navigation*, p. 133 and is quoted repeatedly in the literature.

(166) PRO Chancery Lane, Class E190 Exchequer King's/Queen's Remembrancer Port Books.

(167) N.J. Williams has stated that the port books are '...the most detailed system of customs records of any country, compared with which the Sound Toll Registers of the Danish Kings appear slight and uninformative.' Williams, *Descriptive list*, p. v.

(168) Willan, 'Severn valley'; Willan, *Inland Trade*, p. 20; Wanklyn, 'Shrewsbury boats'; Cox, 'Imagination and innovation'; Davies, 'Economic history of Bewdley'; Rath, 'Tewkesbury hosiery'.

(169) Deane and Cole, *Abstract of British historical statistics*.

(170) Hoskins, W.G., Review of Margaret Spufford's *Contrasting Communities*, *Econ. Hist. Rev.*, 2nd series, XXVIII (1975), p. 712.

(171) Willan, *River navigation*, pp. 32, 68; an early seventeenth century Great Sessions case concerning use of the road from Welshpool to 'New Key' shows that it was in use at this time, National Library of Wales Powis Castle 11646; Davies, 'River trade of Montgomeryshire' (1933), pp. 37-8, suggests that it was built in about 1608.

(172) de Salis, *Bradshaw's Canals*, pp. 46-7, 321-3; Hadfield, *Canals of the West Midlands*, p. 314; measurements above

Coalbrookdale from Ordnance Survey 1:50,000 maps.

(173) Hadfield, *Canals of south Wales and the border*, pp. 185-6.

(174) Davies, 'River trade of Montgomeryshire' (1933), p. 42.

(175) Hadfield, *Canals of the west midlands*, pp. 316-7.

(176) Hadfield and Norris, *Waterways to Stratford*, p. 15-19; Sharman, 'Warwickshire Avon'.

(177) Hadfield, *Canals of south and south east England*, pp. 221-2.

(178) Hadfield, *Canals of the west midlands*, pp. 56-8; Cantrill and Wright, 'Yarranton's works at Astley'.

(179) Denton and Lewis, 'Tern navigation'.

(180) Hadfield, *Canals of the west midlands*, pp. 58-9.

(181) Hadfield, *Canals of the West Midlands*, pp. 318-29; Lindsay, *Trent and Mersey Canal*, pp. 41-5; Hadfield, *Canals of South and South East England*, pp. 376-7.

(182) Wanklyn, 'Shrewsbury boats'.

(183) Trinder, *Industrial revolution in Shropshire*, pp. 4-10.

(184) Court, *Rise of the Midlands industries*, p. 69.

(185) Thirsk, 'South-west midlands', pp. 159-72; Rath, 'Tewkesbury hosiery'; For example, PRO E112/407/341(P36), an Exchequer Court Bill of 1682, describes regular trade in malt being carried on between Tewkesbury and Newport (I am grateful to Dan Beaver of the University of Chicago for this reference); Glos RO GBR G14/4 folio 373 dated 1652 records an agreement to supply malt from Tewkesbury to Waterford.

(186) Ripley, 'Economy of City of Gloucester', pp. 135-42.

Notes to Chapter 1: The Gloucester Port Books

(1) Hinton, 'Port books of Boston', p. xiii.

(2) Most notably Willan, *Coasting trade*; Nef *Coal industry*; Lewis, *Welsh Port Books*; Hoon, *Customs system*.

(3) Williams, *Descriptive List*.

(4) Williams, *Descriptive List*, p. v.

(5) Willan, 'Severn valley'; Willan, *Inland Trade*, p. 20.

(6) PRO E190: Port Books c1690-1720 for Liverpool, Hull, London, Boston, Kings' Lynn, Chester.

(7) For example in three sample years: PRO E190/1252/18, 1257/2, 1259/11.

(8) P.R.O. E134 1 Geo 2 Hil 4. To the interrogation, 'Does the defendant (John Beale, trowman) keep a written record of the goods he carried to or by the City of Gloucester?', the answer was given by William Coldrake that the defendant and his servants keep 'books to enter down all such goods that he carries in his vessels'.

(9) Glos. R.O. Pc 1011, Account book of a Tewkesbury merchant, 17th-century. Only a few words are legible.

(10) Andrews, 'Two problems'.

(11) Willan, *Coasting*, pp. 1-10, pp. viii-ix. In addition to the problems discussed by Andrews, 'Two problems', another of Willan's errors is shown in his work on Gloucester, where he assumes that traffic reduced substantially in the 1730s, whereas a closer examination of the records indicates that they are recording a much smaller proportion of the traffic and this effect is entirely illusory (*Coasting*, p. 175).

(12) Stephens, 'Cloth exports', p. 231.

(13) Hinton, 'Boston', p. xiii.

(14) Jarvis, 'Sources for the history of ports', p. 81; Woodward, 'Port Books', p. 210.

(15) Carus-Wilson and Coleman, *England's export trade*; Jarvis, 'Sources for the history of ports', p. 80; Woodward, 'Port Books', pp. 207-8; Williams, 'Descriptive list', pp. v-vi.

(16) 122 ports and creeks are named in the descriptive lists at the P.R.O.

(17) Its principal features have been described by Gras, 'Memorandum', Customs system; Hoon, *English customs system*; Willan, *Coasting trade*.

(18) Andrews, 'Two problems', pp. 121-2.

(19) Crouch, *Complete View of the British Customs*, p. 247.

(20) Jarvis, 'Sources', pp. 82-3.

(21) Crouch, *Complete View of the British Customs*, p. 247.

(22) Andrews, 'Two problems', pp. 121-2.

(23) Crouch, *Complete View of the British Customs*, p. 249 gives Aberystwyth as a creek of Aberdovey, which was itself a member of Milford. N.L.W. Powis Castle Deeds and Documents 21102-4 explains the problems of Aberystwyth and the delays caused by having to go to Aberdovey which was 'a Place having little or no Trade besides the Exportation of a few Oak Poles sent Coastwise which require no Coquet'.

(24) 1 Eliz I cap II.

(25) P.R.O. Cust. 18.

(26) Andrews, 'Two problems', p. 121.

(27) Crouch, *Complete View of the British Customs*, p. 249.

(28) Royal Charter of 20 June, 1580, quoted in Stevenson, *Records of Corporation of Gloucester*, p. 35.

(29) The typical estuarine ports searched for here were Lydney, Woollaston, Newnham, Broad Oak, Gatcombe and Awre.

(30) P.R.O. E190/1259/01.

(31) Bound with P.R.O. E190/1258/13.

(32) P.R.O. E190/1259/01.

(33) Hereford RO F/VI/DFf/1-3 (Box 1080) has examples in the Foley papers of Forest of Dean iron being sold to Abraham Darby. Johnson, *Charcoal iron industry*, estimates that iron carried up to the Stour Valley from the Forest of Dean was about 2,000 tons a year in the first decade of the eighteenth century, but only about 1,000 tons appear in the Port Books. There may have been a temporary hiatus in traffic in 1705 when the Stour Valley forges were sold by the Foleys and before Knight, who bought them, joined the Foley partnership - Johnson, *Foley partnerships*.

(34) Johnson, *Foley partnerships*, p. 330.

(35) Hereford Diocesan Records, Registrar's Files, letter from Richard Twyford of Madeley to diocesan registrar 17/3/1676/7 on behalf of the widow of Thomas Estope of Benthall who absented herself from the surrogate's court at Ludlow, 'the poor woman is forced to go with her barge down the river for a poor livelihood for her and her children, having no other means or way of living and is forced to go when the water will serve: and is down there now at Evesham'. I am grateful to David Cox for this reference.

(36) Lloyd, *Quaker Lloyds*, p. 49.

(37) National Library of Wales Powis Castle 3928.

(38) Perry, 'Severn', p. 277; Nef, *Coal industry*, p. 97 states that by the Civil War Shropshire coal was supplying Shrewsbury, Bridgnorth, Bewdley, Worcester, Tewkesbury and Gloucester, all by river transport. None of this coal appeared in the Port Books, and only a small amount seems to have been carried further. Calculations were done for 1637, 1647, 1666, 1674, 1684, 1697 (1,107 tons), 1705, 1715, 1722, 1733, 1741/2, 1752 and 1765.

(39) Cox and Wakelin, 'Data derived', p. 136.

(40) See Chapter 5 for a detailed discussion of these figures.

(41) Lewis, 'Welsh Port Books', pp. ix-x; Williams, 'Descriptive list', p. vi.

(42) Gloucestershire R.O. Gloucester Borough Records F4/3 210, 213, 218.

(43) The stray record for Newnham entries in book 1258/13 for June to September 1718 suggest that an officer returned from there quarterly with his own records, which were then copied into the main Port Book in the hand of the usual clerk there.

(44) The signature of the person naming himself as the Controller usually matched the handwriting of the book itself, for example Robert Ludlam, Controller in book 1259/01.

(45) In book 1259/01 in 1718 this was Richard Cossley, who styled himself Customer but did not have handwriting similar to the script of the book itself.

(46) The quarter's entries for Newnham preserved accidentally with book 1258/13 in 1718 appear to have been written and signed by John Hopley.

(47) Fosbrooke, *City of Gloucester*, p. 26 quoting a petition from Bristol against the creation of Gloucester as a Port, cited as Harleian MS 368.

(48) Crouch, *Complete View*, p. 255.

(49) Willan, *Coasting trade*, pp. 4-7.

(50) Crouch, *Complete Guide*, pp. 315, 321.

(51) For example 1258/17 (Christmas 1717 to St John Baptist 1718) has 'Gr' in the margin of its inward section, and 1253/03 (St John Baptist to Christmas 1697) has simply 'R'. Books for Gloucester before the 1670s do not have these marks.

(52) Crouch, *Complete Guide*, p. 255.

(53) Williams, 'Descriptive list', p. vi.

(54) Crouch, *Complete Guide*, p. 315.

(55) Crouch, *Complete Guide*, p. 255.

(56) Defoe, *Tour*, vol. I, pp. 101-3. I am grateful to Dr Malcolm Wanklyn for bringing my attention to this reference.

(57) Gras, *English Custom system*, p. 145.

(58) Willan discusses the different forms of documentation in *Coasting trade*, pp. 2-10, but it seems that even this lengthy account is a simplification of what was a very variably applied system.

(59) Gras, *English Custom system*, p. 145.

(60) Crouch, *Complete guide*, p. 255.

(61) Andrews, *Two problems*, pp. 120-1.

(62) A handful of let passes were recorded in the 1637 and 1647 books.

(63) I am grateful to David Hussey for allowing access to his database of the Bridgwater books for this comparison.

(64) See the last section of this chapter, and the Conclusion for a summary.

(65) I am again grateful to David Hussey for access to this information.

(66) 24 June to 29 September 1718, recorded in 1258/13 and 1259/01.

(67) Hoon, *Organisation of English Custom system*, pp. 266-8; Willan, *Coasting trade*, p. 3.

(68) 1255/05/13/09, 08/03 and 09/06.

(69) The Gloucester book for 1723 is the first in which these seem to appear, E190/1260/06. Boats carrying iron are frequently described in this way.

(70) Willan referred to the supposed decline of trade repeatedly without ever suggesting it might be connected with changes in recording practices. For example, *Coasting trade*, pp. 68, 70, 77, 93, 135, 173.

(71) E190/1157/03; Willan, *Coasting trade*, p. 173.

(72) These figures were calculated by Bill Avery from data extracted from the database with my assistance. I am grateful for permission to reproduce them from his dissertation, 'Brass and copper traffic', p. 33.

(73) Willan, *Coasting trade*, pp. 7-8.

(74) See Wanklyn, 'Working paper', pp. 4-6.

(75) The Act was 26 Geo III, c.60.

(76) Woodward, 'Port Books', p. 208.

(77) Hinton, *Boston*, p. xxi.

(78) Willan, *Coasting trade*, p. 219.

(79) Wanklyn, 'Working paper', pp. 1-2.

(80) Wanklyn, 'Working paper', p. 1.

(81) Wanklyn, 'Working paper', p. 1 cites several examples from the 1680s and 1690s.

(82) Plot, *Staffordshire*, p. 121-4.

(83) And, of course downstream at Bristol. Buckley, 'Glass houses at Bristol'; Powell, 'Glass making in Bristol'; Roberts, 'Glass making in Gloucestershire'; Woodward, 'Glass industry of the Stourbridge district'. There is evidence also of later glass houses in the period, for example at Broseley c1732: Much Wenlock Examinations Book, pp. 46, 56.

(84) Tewkesbury boats regularly carried Droitwich salt which came to the river at Worcester; yet boats from Bridgnorth or Shrewsbury seldom took on salt as they passed through. Exceptions to this rule include one of Darby's merchants, George Bradley who sometimes travelled down from Montgomeryshire but collected iron at Coalbrookdale.

(85) The evidence for this is not so clear, since destinations of commodities can seldom be pin-pointed. Coal boats may have been one exception.

(86) See the detailed discussion of Prankard's activities in Chapter 5 below.

(87) Cox and Wakelin, 'Data derived', pp. 136-8.

(88) PRO E134 1 Geo 2 Hil 4, evidence of William Coldrake and Thomas Hatton.

(89) A large number of inventories of known 'merchants' has been found to include vessels. I am grateful to Mavis Barrett, Nancy Cox, David Lloyd, Barrie Trinder and Malcolm Wanklyn for giving me access to collections of inventory transcripts.For example, Edward Owen of Madeley 1734 Hereford RO; Francis ap Owen 1668 Hereford RO Wills Box 37; Richard Franks of Monmouth 1722 Hereford RO AA20 Box 156; Samuel Harper of Shrewsbury 1687 Lichfield Diocesan Joint RO.

(90) Cox and Wakelin, 'Data derived', p. 136.

(91) Chapters 5 and 6.

(92) Clark, *English commercial statistics*, p. 54; Woodward, 'Port Books', p. 208.

(93) Jarvis, 'Sources for the history of ports', p. 81; Woodward, 'Port Books', p. 210; Clark, *English commercial statistics*, pp. 55-6.

(94) Carson, *Ancient and rightful Customs*; Williams, *Contraband cargoes*; Williams, 'Francis Shaxton'; Cole, 'Eighteenth-century smuggling'.

(95) Metters, *Kings Lynn*, p. 81.

(96) Jarvis, 'Sources for the history of ports', p. 81.

(97) Clark, *English commercial statistics*, pp. 52-3.

(98) Andrews, 'Thanet seaports'; George, 'Pembrokeshire sea trading'; Farrant, 'Seaborne trade of Sussex'.

(99) In 1723 four journeys from Gloucester were recorded as having one or two 'suff'ce annexed'. The boats concerned usually carried iron but none was recorded on these occasions.

(100) Andrews, *Two problems*, pp. 119-21.

(101) There were limekilns in large numbers around Benthall, and more down the banks of the Severn. Lime industries also existed around Bristol and the Forest of Dean. The *Gloucester Journal*, 24 October 1758, reported on a trow carrying lime up the Severn from Bristol to Worcester which was engulfed in a storm and destroyed when the lime caught fire as a result. I am grateful to Pam Daw for this reference.

(102) Higgins, 'Clay tobacco pipes', pp. 304, 317-38.

(103) Linnard, 'Moving timber on British rivers'.

(104) This is discussed at greater length in Chapter 4.

(105) Exchequer deposition of 1659 refers to a dispute about apples apparently being traded in large quantity between Minsterworth and Shrewsbury. These would not have appeared in the Port Books in any case as they did not pass through the Port. Quoted in Thirsk and Cooper, *Economic documents*, p. 370.

(106) Clark, *English commercial statistics*, p. 55.

(107) Woodward, 'Trade of Elizabethan Chester', pp. 138-9.

(108) Wiggs, 'Seaborne trade of Southampton'.

(109) Williams, 'Francis Shaxton'.

(110) Cox and Wakelin, 'Data derived', p. 138.

(111) Wanklyn, 'Working paper', p. 4.

(112) See Chapter 5 below.

(113) The Port Books record 139 tons or 87% of Houghton's figure, but consumption of copper in Bristol and London must have been more than that remaining: Avery, 'Brass and copper', p. 43.

(114) Flinn, *Origins of the industrial revolution*, p. 13.

(115) Andrews, 'Customs ports of Sussex'; 'Chichester and the grain trade'; 'Thanet seaports'; 'Port of Faversham'.

(116) Williams, 'Francis Shaxton'; Williams, *East Anglian ports*.

(117) Stephens, 'Cloth exports'.

(118) Notably by members of the Cambridge Group for the History of Population and Social Structure, Wrigley and Schofield, *Population history*.

Notes to Chapter 2: Port Books and Computer-aided Analysis

(1) Mr David Hussey of Wolverhampton Polytechnic, funded by the Leverhulme Trust, is currently using the same system to computerise sample books for other ports in the Bristol Channel c.1700; Mr Michael Price of the Department of Extramural Studies at University College Cardiff is undertaking work using the same system on the Port Books for Swansea in the seventeenth century; and the ESRC/Leverhulme Trust Portbooks Programme is currently computerising selected books for other ports around England and Wales.

(2) Stephens, 'Exchequer Port Books as a source', p. 212.

(3) Minchinton, *Overseas Trade*, p. 53.

(4) Exceptions to this general pattern have been noted in the previous chapter, however it is notable that even those who have used Port Books in a central way for certain studies have bi-passed them in later work where they would be valuable given the possibility of more rapid searching. For example Weatherill used Port Books in detail for her study of the output of the English potteries, but not in her more wide-ranging work on various goods in her study of English material culture. Woodward used Port Books systematically in his study of the trade of Elizabethan Chester, but not in his study of the recycling of commodities in pre-industrial England.

(5) For example the detailed work by Thirsk, 'Agricultural innovations and their diffusion'; the thorough regional study of the coal trade by Langton, 'Geographical Change'; Weatherill's work on the consumer revolution; Ashton and Sykes, *Coal industry*; and Hamilton, *Brass and copper*.

(6) Even Willan's outstanding study *The English Coasting Trade 1600-1750* used a series of single year samples many decades apart, interpreting variation between sample years as long-term development.

(7) For example Stephens, 'Cloth exports of the provincial ports'; Stern, 'Cheese shipped coastwise'.

(8) For example Andrews, 'Port of Chichester and the grain trade'; Hinton, 'Port Books of Boston'; Jackson, *Hull*.

(9) For example Woodward, *Elizabethan Chester*; Williams, 'East Anglian ports c1550-90'; Lewis, *Welsh Port Books, 1550-1603*.

(10) Willan, *Coasting trade*, for example his discussion of the trade of Boston, pp. 123-5.

(11) For example see his discussion of the south Wales coal trade, Willan, *Coasting Trade*, pp. 64-8. His conclusions regarding salt and tobacco are shown in the chapters on those commodities below to have been misguided because he was not able to evaluate changes in the quality of recording.

(12) Metters, 'Kings Lynn'.

(13) For example Weatherill, 'Growth of the pottery industry', used Port Books for Hull, Liverpool and other ports to estimate output of the Staffordshire potteries, but not ones for Gloucester although pottery was also exported in that direction. Examination of the Gloucester Port Books in fact shows earthenware to have been a regular cargo through Gloucester on boats from river ports close to Staffordshire, especially Shrewsbury and Bridgnorth, for example see Wanklyn, 'Shrewsbury boats', p. 54.

(14) Wakelin, 'Comprehensive Computerisation'.

(15) For example, Morgan and Moss, 'Urban wealthholding', especially p. 182; O'Gorman, 'Electoral behaviour', especially pp.226-7.

(16) For example, Palmer, 'Computerising Domesday Book'. Increasing attention is being paid in the 1990s to text mark-up, and particularly the Text Encoding Initiative, which is proposing standard codes for marking up texts which will allow easy transfer of datasets from one user to another. The author is currently participating in examinations of the potential for using text mark-up for coastal Port Books.

(17) These have both recently been published: Wanklyn, 'Shrewsbury boats'; Cox, 'Imagination and innovation'.

(18) The codes were devised by Dr and Mrs Cox with advice from Mrs B. Hammond of the Polytechnic Computer Centre.

(19) Mike Griffiths has been most closely involved for most of the development of the database and has made an outstandingly important contribution to it. Advice was taken initially from Mr P. Athwall and Mrs B. Hammond, and database support has been provided in the later stages also by Mrs. D. Chaudry.

(20) Both software products are supported by PRIME UK.

(21) The main problems of utilising the older database in the new one were that it encouraged the use of standardised spellings and codes to some extent, the work of adding the missing data to each record created errors and was more laborious than fresh transcription, and the need for the new database to transcribe some records but not others which had already been entered caused considerable confusion for the volunteers. In the latter stages of transcription, in fact, volunteers transcribed whole books including entries which had already been done, as this was felt to be more effective.

(22) As part of the work for this thesis, databases were created for sample books for Chepstow and Bristol. Since then, databases have been set up following an identical model by David Hussey for a large number of ports as part of his research on the trade of the Bristol Channel region c.1699.

(23) The principles of this design as it stood in 1986 are described in Wakelin, 'Comprehensive computerisation'.

(24) British Standards Institution, *Data for interchange.*

(25) For an explanation of these problems see Hartland and Harvey, 'Information engineering', especially pp. 50-6.

(26) Some problems naturally arise from this, such as the fact that for example 'HUGHES J' as a surname will not be regarded as the same as 'HUGHES' or 'HUGHES S' in a search, even though at certain times all may have been used to refer to the same person. The problem has been overcome by creating a lookup table of surnames which allows searches to be done on standard spellings of surnames without taking account of the 'S' or 'J' suffix if desired. The recognition of both surname and status of this kind as one attribute does not therefore cause problems in searching, although a purist view might be that the two should be divided. It is likely that the overheads in storing the data and undertaking more complex searches of having two additional fields for the sake of this would be quite unjustified.

(27) One other problem with omitting the 'Master' and 'Merchant' attributes and instead using these terms to label the relevant fields is that it injects a degree of certainty into the database which in a few individual books may not be justified. In these cases the abbreviations for Master and Merchant are virtually indistinguishable and a process of contextual interpretation has had to be used to determine whether the first or the second named was in fact the merchant.

(28) Only two vessels in the complete database were recorded as lost: the Speedwell 'lost at sea' in 1711 (1257/03/05/20) and the William and Susannah in 1731 of which it was written, 'This vessel was sunk' (1262/11/13/10). Notes about duties were relatively frequent: for example among such references in 1705 were 'Coal duty paid by Richard Dalton' (1255/05/11/17) and 'Irish tallow paid duty at importation' (1255/05/09/06).

(29) The most common occurrence of this sort is when a separate coquet was issued for wool alongside a coquet for other goods on one voyage, discussed below in the section on techniques of analysis.

(30) This information might be more satisfactorily placed in another field as a separate attribute, even though it only appears in a small proportion of records.

(31) The data model is effective in recognising these additional names, and allowing as many to be stored as are given, however it is a failing currently that their exact role can be entered only in the Miscellanea field if it is stated.

(32) To say arbitrarily, for example, that there were 7.5 packs of each would be very misleading. It would be even more dangerous to give simple precedence to the first item, stating that there were 15 packs of thread and no Manchester goods.

(33) The fact that the different commodities within the field are separated in this way means that searches for 'thread' can be undertaken which do not find similar unwanted terms such as 'pack thread', or so that 'horn' can be separated from 'lanthorns' which shares an identical string. The terms are now stored as formal sub-fields within INFORMATION and the '+' signs are for display only.

(34) A project aiming to compile a Dictionary of Traded Goods established at the Polytechnic since the database was designed, for example, is concerned to examine, amongst other things, the exact variant spellings of commodities over a longer period.

(35) For example, Metters's work computerising Port Books for his study of 'Kings Lynn', which used classifications instead of original commodity descriptions. Probably the majority of historical computing projects until recently have tended to use numerical coding or standardised key words rather than the original phrases: see Denley and Hopkin, *History and computing* and Denley, Fogelvick and Harvey, *History and computing II.*

(36) Before the author's appointment, members of the research class at Bridgnorth led by Dr M. Wanklyn and Dr B. Trinder transcribed details of voyages by Bridgnorth boats from some of the Port Books in 1983-4. This was followed from late 1984 by work by members of the Bewdley Research Group, led by Mr D. Lloyd, to transcribe voyages by Bewdley boats.

(37) The names of these volunteers are given in the acknowledgements to this thesis. I am very grateful to all who participated.

(38) This operation is performed for several attributes in the database, utilising a different vocabulary file for each.

(39) The fact that this has been done has been noted in the Check field of the database.

(40) The majority of work on the sample years has been done by the author, but significant assistance must be acknowledged from Mrs N. Cox, Mrs C. Hyde and Mrs M. Mills. Checking of the remainder (and larger part) of the database was begun by the author and, since his departure from the Polytechnic, has been organised by Mr David Hussey with assistance from Dr Malcolm Wanklyn and Mrs Polly Hamilton.

(41) The techniques referred to here are more clearly defined in Taylor, *Quantitative methods in Geography*, pp. 73-6, and Floud, *Quantitative methods for historians*, pp. 161-171.

(42) The analysis of a random sample uses probability and therefore requires a substantial number of occurrences of any phenomenon being studied if the findings are to be accurate. Within a time-period sample an absolute statement can be made about any number of occurrences within the given period and the probability of this being representative of other time periods can be addressed explicitly.

(43) The database when completed will contain approximately 37,400 records, of which 33,600 fall into the period covered by this study. I am grateful to David Hussey for providing the best available figures, in July 1991.

(44) These are the 1640s, 1650s, 1660s and 1740s.

(45) The overseas books for Gloucester transcribed for this study were as follow. The overseas books record a negligible volume of trade compared with the coastal books.

1663-4	1249/03
1674	1249/11
1697	1252/18
1722	1259/11
1733	1263/09
1753	1265/07

(46) The first year divided into two books in the Gloucester series was in fact 1686 (E190/1251/07 and E190/1251/12), however the Customs officers reverted to using just one book until December 1690, after which all years were in two volumes.

(47) The peculiarities of this 'Coast Book' have been discussed in the preceding chapter.

(48) Perhaps the prime example of the painstaking accountability of methodology in this way is Wrigley and Schofield, *Population history of England and Wales*.

(49) For example, see Baskerville, 'Preferred linkage'; Best, 'Computing the unmeasurable'; Thaller, 'Theory of historical computing'.

(50) This point is developed by Dr Pat Hudson and others in Brown, A., Schurer, K., and Wakelin, P., *Computing for local and regional history*, forthcoming, Leicester, 1992.

(51) This appear to have been the experience of Graffin Prankard in the 1730s-1740s owing to his bankruptcy, discussed below.

(52) None of the Gloucester Port Books sampled reveals any other second entry, with the possible exception of some entries in 1684. In this year a few coquets are listed adjacent to one another with the same boat and date but John Chance as master of one and John Chance junior the other. The entries are for similar cargoes. This is difficult to explain, but the most plausible explanation seems to be that there were two boats of the same name operated by the Chance family. Although it would be reasonable to have two different members of the family acting as merchants and therefore having two coquets, there is no reason why both should act as masters on the same voyage. At any rate, these few voyages in 1684 are the only examples of the problem that appear to arise.

(53) No record has been found of legislation specifically implementing this change.

(54) Based on analysis of the sample books computerised for these ports in 1699.

(55) Further developments of look-up tables within the database should eventually make it possible to do this automatically.

(56) It is not as significant, for instance, to say that 100% of the two voyages from Tenby carried a commodity, as to say that 66% of the 15 from south west Wales carried the same thing. With only two voyages in question the strong association with the

commodity might simply be chance.

(57) The geographical divisions used and the reasoning behind them are discussed in the next chapter.

(58) I am grateful to David Hussey, Angela Brown and Nancy Cox for critical discussions of this classification, and especially to David Hussey for assistance in classifying large numbers of the commodities.

(59) The programme is written using the fourth-generation PACE interface. I am extremely grateful to Mike Griffiths of the Polytechnic Computer Centre for writing this programme to the brief provided.

(60) Commodity attributes which contain several different goods, for example in a string such as 'LINEN + WOOLLEN + HABERDASHERY + CUTLERY', have to be treated differently. The programme temporarily strips out the items separated by '+' signs to regard them as individual attributes. Again, if one is found to be of the desired class, the record is counted and the search moves on to the next record.

(61) The spreadsheet used has been SuperCalc5.

(62) The graphs were produced using a custom-made programme by Mr D. Morgans of the Wolverhampton Polytechnic Computer Centre. The graphic output of a package like SuperCalc was unsuitable because it did not allow individual sample years to be expressed other than as values on the x axis of the graph with zero values wherever a sample year did not exist. It also failed to distinguish, unlike the custom-made programme, between, on the one hand, adjacent sample years which could be linked by a solid line to show actual fluctuations, and, on the other hand, separated sample years which could only be linked by a broken line to show clearly that the line was a purely conjectural trend.

(63) The mapping programmes were developed by Mr Z. Parvan of the Wolverhampton Polytechnic Computer Centre. Initially, the package UNIRAS was used, but this proved to be unsuitable owing to a difficulty with plotting onto paper, and the programme had to be re-written using GIMMS.

(64) Southall and Oliver, 'Drawing maps with a computer... or without?'.

(65) I am very grateful to both Mr Morgans and Mr Parvan for their considerable efforts in developing these programmes.

(66) The Economic and Social Research Council is currently funding a project by Dr Mark Overton of the University of Newcastle to compile a price index for the seventeenth and eighteenth centuries from the valuations of everyday goods contained in probate inventories. When this database becomes available it may go some way towards solving the problem of assessing trade values.

(67) Willan, *Coasting trade*, passim; Wanklyn uses figures similarly, 'Shrewsbury boats', pp. 54-5.

(68) For example, Nef, *Coal industry*; Andrews, 'Chichester and the grain trade'; Weatherill, 'Growth of the pottery industry'.

(69) The use of the singular, it seems, may indicate that a number of cwt rather than a number of bricks was meant in a phrase like '500 brick'.

(70) For example 'BURTHEN 20 TON' and 'MERCHANT=MALTSTER OF TEWKESBURY'.

Notes to Chapter 3: Patterns of River Trade

(1) Williams, *East Anglian Ports*.

(2) Jackson, *Hull*.

(3) Armstrong and Bagwell, 'Coastal Shipping'.

(4) Freeman, 'Transport', pp. 84-7.

(5) Dyer, *Consumer and the market*.

(6) This is very difficult to estimate, as 1656 may have been different from other sample years in more ways than one. It was a prosperous year when economic activity seems to have been booming again after a long period of disturbance, and both 1666 and 1674 were poor years for other reasons, namely plague and war in 1666 and economic depression in 1674. The figure of 6-700 has been arrived at by adding to the 356 upstream voyages for 1656 the number downstream recorded in 1666 (259). If downstream voyages had also been better recorded this figure would be higher, but it is likely that upstream recording was more deficient than downstream, owing to the fact that Gloucester seems to have issued few let passes compared with other ports: see Chapter 1.

(7) See Chapter 1.

(8) Minchinton, *Overseas Trade*, p. 12. Thirsk and Cooper, *Economic Documents*, quote two observers at length complaining of the 'Great Decay of Trade' in 1674 and 1675, pp. 88-100.

(9) Perry, 'Description of the Severn', p. 278, wrote that the numbers of vessels on the Severn had increased by 6% just between 1756 and 1758.

(10) Willan, *Coasting trade*, contains repeated references to trade having declined before his samples taken in the 1730s and 1740s, for example pp. 68, 70, 77, 93, 135, 173. *On p. 173 Willan notes from the Bristol Port Books that 'In the eighteenth* century Bristol's outward shipments became much less concentrated on Gloucester', having only 34 in 1735 compared with 221 in 1685. This misinterpretation is especially surprising given that on p. 175 he states that in 1736, 273 voyages were recorded in the Gloucester books as going to Bristol.

(11) See Chapter 1.

(12) This is indicated by the general recording of upstream and downstream traffic, and by the fact that the downstream goods tended to be bulkier than those upstream. *Also, since the merchants for nearly all voyages were from the Severn-side towns*, it would have been more difficult for them to arrange back-carriage than outward cargoes.

(13) This is discussed in full in Chapter 1.

(14) Gerhold, 'London carrying', p.400.

(15) Gerhold, 'London carrying', pp. 400-3.

(16) Willan, *Coasting trade*, p. 145, records that 6,837 coasters entered London, from sources independent of the Port Books.

(17) Based on the percentage figures for 1637, 1647, 1666, 1674, 1684, 1697, 1706, 1715 and 1722 in order to avoid a bias toward the five-year sample period or toward the unreliable years.

(18) Wanklyn, 'Shrewsbury boats', pp. 51-2.

(19) See below, Chapter 6.

(20) Perry, 'Severn', p. 278.

(21) Cox and Wakelin, 'Data derived', pp. 137-8.

(22) See above, Chapter 1.

(23) These figures are calculated from sample years 1666, 1674, 1684, 1697, 1706, 1715 and 1722. The data before 1666 is so different as to have meaninglessly distorted the data, and the records are untrustworthy for Chepstow traffic after 1725. Only

1706 has been chosen from the five years 1704-8, so as not to bias the mean toward that period.

(24) Calculated from sample years 1637, 1647, 1666-1697, 1706 and 1715-1765.

(25) These figures are based on the sample years 1666-1697, 1706, and 1715-1765. Recording of shipments to and from south-west Wales does not seem to have been diminished by the re-organisation of recording in the Gloucester Port Books c1725.

(26) Based on sample years 1697, 1706, 1715, 1722, 1733, 1741, 1752 and 1765. It is assumed that the recording of voyages to and from Somerset ports was not affected by the changes in recording at Gloucester c1725, as numbers of voyages remained reasonably static throughout the first quarter of the eighteenth century.

(27) Cox and Wakelin, 'Data derived', pp. 139-40; see also Chapter 1 and Chapter 5.

(28) Discussed in Chapter 1.

(29) *The western flying post; or Sherbourne and Yeovil mercury and general advertiser*, XXXV, (3 November 1783). I am grateful to Dorian Gerhold for this reference.

(30) Dyos and Aldcroft, *British transport*, pp.37-45; Hadfield, *British canals*, pp. 16-22; Jackman, *Development of transportation*, pp. 157-64; Rolt, *Navigable waterways*, pp. 1-5; this view could be said to be inherent in Willan's work, *River navigation*, which takes river improvement, not in fact river navigation, as its subject.

(31) Holderness, *Pre-industrial England*, pp. 1-3; Chartres, *Internal trade*, p. 58.

(32) Minchinton, *Overseas trade*, p. 12.

(33) Ashton, *Economic fluctuations*, p. 183. See also the discussion on the tobacco trade in 1715 in Chapter 6.

(34) The one month when only three voyages were recorded was April 1704. There were two other months during which there were only three voyages, but in both cases this was because there had been a voyage on the 31st of the preceding month, and so the regularity of service was maintained.

(35) Telford's description is in Plymley, *General View*, pp. 317-33. Diary of John Kelsall, Friend's House Library. I am grateful to Dr Melvin Humphreys for this reference.

(36) The water was fresh, whereas that from Worcester downwards would have salt in increasing quantities, the altitude was greater, and the ameliorating effects of the sea were much less.

(37) Discussed by Robert M. Pirsig in *Zen and the art of motorcycle maintenance: an enquiry into values* (1974) pp. 75-7.

Notes to Chapter 4: The Goods of Trade

(1) Willan, *River navigation*; Hadfield, *British Canals* and volumes in the Canals of the British Isles Series; Alsop, 'River Nene'; Barker, 'Sankey navigation'; Cohne, 'Non-tidal Wye'; Course, *Itchen Navigation*; Cross, 'Salisbury Avon'; Denton and Lewis, 'River Tem'; Duckham, *Yorkshire Ouse*; Duckham, *Inland waterways of east Yorkshire*; Hopkinson, 'South Yorkshire and north Derbyshire'; MacMahon, 'Beverley and its beck'; Sharman, 'Sandys and the Warwickshire Avon'; Summers, *Great Ouse*; Tann, 'Yorkshire Foss'; Thacker, *Thames highway*; Unwin, 'Aire and Calder'; Willan, 'Great Ouse'; Willan, 'Bath and the Avon'; Willan, 'Chester and the Dee'; Willan, 'Witham to the Yare'; Willan, 'Salisbury and the Avon'; Willan, 'Weaver'; Willan, 'Yorkshire river navigation'; Willan, *Don navigation*.

(2) Beckwith, *Gainsborough*; Wakelin, 'River Tone'; Wanklyn, 'Shrewsbury boats'; Jones, 'Lea valley'.

(3) Dyos and Aldcroft, *British transport*, pp. 43-5; Duckham, 'Canals and river navigations', pp. 128-35; Willan, *River navigation*, pp. 1-2, 123-6.

(4) Chartres, *Internal trade*, pp. 41-2.

(5) Freeman, 'Introduction', pp. 12-17.

(6) PRO E190/1252/12/10/11, the Mary of Bewdley, coquet dated 15 April 1697.

(7) Willan, *Coasting trade*, p. 109.

(8) I am very grateful to Mike Griffiths for writing the programmes to do this and to David Hussey for assisting with and moderating the task of manual editing.

(9) Whilst 88 of the different commodities counted appeared only once in 1666, the number which appeared only twice was 28, and the number that appeared only three times was 15.

(10) The 1666 and 1706 lists show a wider and wider range of manufactures and crafts compared with 1637.

(11) Rowlands, *Masters and men*, pp. 99-102.

(12) Aldcroft and Freeman, *Transport in the Industrial Revolution*, p. 10.

(13) Hoskins, *Fieldwork in local history*, pp. 59-60.

(14) The count is actually of the number of commodity fields used in the database per voyage, and so is affected by the manner in which the Customs Officers wrote and by the method of computerisation of cargoes described in Chapter 2. For example, the description in the records '3 barrels tar, 7 casks and rundlets port and Spanish wine, 2 box and 1 crate oranges and lemons, 2 hogsheads 3 barrels and 1 case tobacco quantity 200 lbs' would be divided during computerisation into 5 commodity fields and counted as 5 consignments in this analysis. The number would have been reduced by one if the Customs Officer had referred to '3 boxes and crates oranges and lemons'; it would have been increased by three if he had not given the equivalent in lbs for the tobacco. Although this seems damaging to the results, it is in fact of limited importance, as the great majority of cargo descriptions do not embody such complexities. Nevertheless, it is important to recognise that the product is neither a count of the numbers of different commodities carried, nor of the numbers of separate freight agreements made by the merchant. It is a much more abstract index of diversity.

(15) I am grateful for discussion of the classification to David Hussey, Angela Brown and Nancy Cox, and particularly to David Hussey for sharing the task of individually classifying all the items from the Portbooks Database.

(16) Extensive research on this term has not found any interpretation. The internal evidence of the Port Books, and the direction of trade upstream to places where there was glass making suggests that they may have been either a kind of seaweed, or possibly a kind of sand. The seasonal pattern of trade seems to rule them out as a shelfish.

(17) The classifications file in the Portbooks Database provides the full list of terms and their classifications.

(18) Riden, 'Output of British iron industry', p. 443.

(19) This is described fully in Chapter 5 below.

(20) All of this was shipped from Bewdley, and the term seems to have referred to Stourbridge fire clay rather than to clay for

making earthenware, which was in plentiful supply elsewhere. Plot, *Staffordshire*, pp. 121-4 makes it clear that 'pot clay' was that clay from around Stourbridge used for making pots for the glass industry.

(21) For an account of rapid change following the Mines Royal Acts of 1689 and 1693, see Rees, *Industry before the Industrial Revolution*, pp. 492-504.

(22) Nef, *Coal industry*, pp. 64-5.

(23) Nef, *Coal industry*, p. 96.

(24) Rudge, *General View*, p. 331, said after the canal connections to the midlands had been completed, that coal was for sale in Gloucester from Staffordshire, Shropshire and the county of Gloucestershire, but that the former sources were 'ever prefer'd'.

(25) Kelp was carried on between 3 and 12 voyages in all the sample years from 1666 to 1722. Exchequer Court Deposition, PRO E134 1 Geo 2 Hil 4 contains evidence of Thomas Hatton that John Beale of Bewdley 'doth often times Carry Some goods as kelp for makeing Glass'.

(26) Avery, 'Brass and copper'; Cox, 'Imagination and innovation'.

(27) The search terms used were for commodities like '...wheat...', '...barley...', '...malt', 'malt +...', '...cutlings...', '...meal...', '...oats', 'oats +...', '...bean...', '...peas...', '...corn', 'corn +...', '...flour...', '...pulse...', '...rye', and 'rye +...', where three dots indicate a wildcard search. The purpose of the double searches, as for oats, it to exclude other words with the same letters (in this case goatskins) whilst permitting the full range of valid combinations that occur. Similarly, the double search for malt excludes things like malt mills and malt shovels.

(28) Eighteen different measures are used for crops in the sample years studied. These have been converted to bushels, which was the most common measure in use. The wey seems for arable crops regularly to have been 40 bushels and the bushel itself for arable crops was a relatively invariable measure. In the downstream trade of 1715, of the total estimated volume of the trade, 98.66% was stated in bushels or weys and only the 1.34% remaining measured in less certain measures. These were converted as follows: Quarter = 8 bushels (Zupko, *Dictionary*, pp. 139-40 states it is equal to a seam, at 64 gallons or 8 bushels); Strike = 2 bushels (Zupko, *Dictionary*, p. 165 states the strike was usually 2 bushels for grain but could vary from 0.5 to 4 bushels. Harrison, 'Agricultural measures' states that in the west midlands a strike often meant 1 sachel or more generally 1 quarter of 8 bushels); Cwt = 2 bushels (see not on the bushel above); Barrel = 4 bushels (Zupko nor Harrison mentions barrels for grain, but Zupko, *Dictionary*, pp. 13-16 gives barrel of soap 32 gallons and wine 36 gallons); Bag = 3 bushels (This is the most common measure for grain in the Port Books after the bushel and the wey. Harrison, 'Agricultural measures', p. 819 gives the bag as 3 bushels for corn in Staffordshire, Devon and Shropshire but 6 for Staffordshire oats and malt. Zupko, *Dictionary*, gives Devon wheat bag as 2 bushels of 140 lbs, Shropshire wheat as 3 bushels and south Wales oats as 5 bushels. A few entries in E190/1260/04 have entries in bags and bushels indicating bags most often around 5 bushels, but there is no way of telling whether these entries were representative or noted because they were unusual); Sack = 4 bushels (Harrison, 'Agricultural measures', p. 820 states that the sack was fairly uniform at 4 bushels. Zupko, *Dictionary*, pp. 149-50 gives the sack of flour as 5 bushels and grain generally 4 heaped bushels); Hogshead = 7 bushels (Zupko, *Dictionary*, pp. 78-9 gives no measure for grain, but suggests beer was 54 gallons, ale 48 gallons and wine 63 gallons); Box = 2 bushels (Zupko, *Dictionary*, p. 23 makes it clear this was not a standard measure, but states Derbyshire coal box as 2.5 bushels); Quintal = 6 bushels (assumed to be one fifth like the quarter's one fourth); But = 15 bushels (Zupko, *Dictionary*, pp. 27-8 suggests the but was generally 2 hogsheads); Ton = 40 bushels (see cwt above); Cask = 4 bushels (Zupko, *Dictionary*, pp. 33-4 states a cask of wheat flour is 2 cwt); Peck = 0.25 bushels (Zupko, *Dictionary*, p. 128); Tierce = 5.25 bushels (Zupko, *Dictionary*, p. 171 states tierce as 42 gallons); Basket = 2 bushels (*this* is not a standard measure and appears only once in the sample years, so has been guessed to be an easily lifted weight).

(29) Clay, *Economic expansion*, Vol. II, p. 45.

(30) Davis, 'English foreign trade, 1700-1774', p. 119.

(31) See the discussion of salt in the next chapter.

(32) Avery, 'Brass and copper', pp. 11-18; Cox and Wakelin, 'Data derived', pp. 139-40.

(33) This is discussed in more detail in the following chapter.

(34) See Chapter 5 for further details of this trade.

(35) See the discussion of this in Chapter 1.

(36) Trinder, 'La vie d'un region'.

(37) See the section on the port of Tewkesbury below.

(38) See the tables in the following chapter.

(39) Cox and Wakelin, 'Data derived', pp. 137-8 and note 149.

(40) Thirsk, 'South west midlands', p. 167.

(41) Conversions used are as follows. It is assumed, following Higgins 1987, that average weight of a pipe is 1.5oz, and that a gross contained 144 pipes. 'Score' 0.14 gross; 'barrel' 18 gross (Zupko gives butter barrel as 230lb and Pembrokeshire coal barrel as 248lb); 'Hogshead' 45 gross (hogsheads varied greatly but a median value is about 600lb); 'Basket' 9 gross (Langton 1979 gives Lancashire coal basket as 120lb); 'Crate' 20 gross (Weatherill 1983 pp16-17 gives variation in crates of earthenware from 1 to 5 cwt, but suggests the smaller were more common - 267lb is chosen here); 'Box' 10 gross (probably considerably smaller than a crate); 'Cask' 10 gross (probably smaller than a barrel).

(42) Personal communication from David Higgins.

(43) Higgins, 'Broseley', p. 311.

(44) Higgins, 'Broseley district', p. 308, pp. 332-5. I am grateful to David Higgins for drawing my attention to this evidence.

(45) Owen, 'Description of Pembrokeshire'.

(46) Jones, *Tewkesbury*, p. 104.

(47) See Chapter 1, section ii.

(48) Roberts, 'Glassmaking'.

Notes to Chapter 5: The trade in salt

(1) Plot, *Staffordshire*, pp. 87-96; Houghton, *Husbandry*, volume 2, pp. 75- 107; Hughes, *Administration and finance*, pp. 1-2.

(2) Salt ways existed throughout Britain. For example, salt ways from Droitwich extending throughout the midlands are discussed in Berry, 'Borough of Droitwich', pp. 55-6; those from Cheshire are discussed in Crump, 'Saltways from the Cheshire witches', passim; and the Peak District salt routes are described by Hey, *Packmen*, pp. 152-9.

(3) For example, Clapham, *Britain to 1750* makes little mention of it, Cipolla, *Before the industrial revolution* does not address this branch of trade, Holderness, *Pre-industrial England*, p. 92 omits it from his list of trades important to the development of the economy, and text books on the industrial revolution in England, such as Deane, *First industrial revolution*, and Berg, *Age of manufactures* do not acknowledge it as an industry of importance.

(4) Hughes, *Administration and finance*.

(5) For example, Ellis, 'Tyneside salt'; Barker, 'Cheshire salt'; Chaloner, 'Salt in Chesire'.

(6) Houghton, *Husbandry*, volume II, pp. 75-92; Stamper, 'Shropshire salt', *passim*; Plot, *Staffordshire*, p. 93.

(7) Berry, 'Borough of Droitwich', pp. 49-51.

(8) Plot, *Staffordshire*, pp. 93-6.

(9) Berry, 'Borough of Droitwich', p. 50.

(10) Both brine and seawater contain other salts than common salt: namely calcium carbonate, calcium sulphate, magnesium sulphate, potassium-magnesium chloride and magnesium chloride. Whereas brine usually contained mere traces of these, seawater contains significant quantities. Chaloner, 'Salt in Cheshire', p. 60.

(11) Defoe, *Tour*, vol. I, p. 261.

(12) Stamper, 'Shropshire salt', p. 81.

(13) Ellis, 'Tyneside salt', p. 46.

(14) Houghton, *Husbandry*, pp. 90-1.

(15) Plot, *Staffordshire*, p. 93.

(16) The words and phrases searched for were as follows: 'Bay salt', 'clean salt', 'clod salt', 'dirty salt', 'Droitwich salt', 'English made salt', 'English salt', 'Enginado salt', 'foul salt', 'French salt', 'Lisbon salt', 'lix and salt', 'Portugal salt', 'rock salt', 'salt', 'salt and oil', 'salt and tallow', 'salt brine', 'salt loaves', 'Spanish salt', 'white salt', 'white salt for fishery', 'brine' and 'salt brine'.

(17) Although there was some variation in units of measurement for salt, this was not extreme. The measures have been converted according to the following principles in an effort to provide an optimum solution. Although some of the estimates of equivalents are very approximate, these should not be problematic in that many of the most difficult measures to interpret appeared only very rarely. In most of the years sampled the bushel and the gallon were the only measures used. 1 bushel = 8 gallons, or 56 lb (9 & 10 Gul. III, c. 6, s. 1 and 22 Car. II, c. 8, s. 2). 1 ton = 40 bushels (Houghton, *Husbandry*, p. 75). 1 barrel = 4 bushels (Houghton, *Husbandry*, p. 85). 1 hogshead = 7 bushels (Zupko, *Dictionary* gives the beer hogshead at 54 gallons and other sources do not shed light on a special hogshead for salt). 1 bag = 3 bushels (Zupko, *Dictionary* give the Shropshire wheat bag as 3 bushels, and no better estimate has been found). 1 gal = 0.125 bushels (as above). 1 kilderkin = 2 bushels (Zupko, *Dictionary* gives beer and ale kilderkins as 18 and 16 gallons respectively). 1 cwt = 2 bushels (estimated from the ton above). 1 load = 40 bushels (Zupko, *Dictionary* and Houghton, *Husbandry*, p. 106). One important variation which may affect the figures for upstream salt shipments slightly is that the bushel of imported salt was 84 lb (*Book of Rates 1784*, pp. 437-8), and it is impossible to tell in most cases whether this was imported or brought coastally, let alone whether the 84lb bushel was being used.

(18) Staffordshire Record Office, Aqualate Papers D(W)1788, parcel 43, bundle 10, 10th May 1661.

(19) Hadfield, *West Midlands*, p. 59; Gaut, *Worcestershire agriculture*, pp. 80-1; Nash, *Worcestershire*, p. 306.

(20) Willan, *River navigation*, p. 37; Hughes, *Administration and finance*, pp. 225-6.

(21) Unprovenanced and undated MS in the Foley Scrap Books, Worcester R.O. 705:139 BA8397/98 (iii). This estimates land carriage from Droitwich to Worcester at 6s. and water carriage at 9d. for 30 cwt, and points out that production costs would also have been reduced by the availability of cheaper coal.

(22) Wanklyn, 'Shrewsbury boats', pp. 43-4 sees a correlation between the salt trade on Shrewsbury boats in the seventeenth century and periods of war, and it is to be expected that there would be an effect at times on the amount of salt imported from the continent. Berry, 'Borough of Droitwich', p. 56 states that the market for Droitwich salt was larger during the Dutch Wars.

(23) Rastell, 'Salt waters of Droitwich', p. 1064.

(24) De Vries, *Economy of Europe*, pp. 102-3. Davis, *English shipping*, pp. 315-37 identifies various effects of the war on the supply of seamen, and the rewards, principally to the English, of prize, but he does not suggest that there was any material interruption of trade with France or Iberia. Whilst Hughes, *Finance and administration* discusses high prices and scarcity of salt caused by warfare around 1630 and later, he gives no indication of problems of supply in the 1660s.

(25) Willan, *River navigations*, p. 110.

(26) See below.

(27) Willan, *Coasting trade*, pp. 101-2. Willan gives the figures for each unit of measure, which have been converted by the same rules stated above. He assumed that it was Worcestershire salt, however it is likely that a substantial proportion was from Cheshire.

(28) Hughes, *Administration and finance*, p. 177.

(29) Quoted in Thirsk and Cooper, *Seventeenth-century economic documents*, p. 100.

(30) Hughes, *Administration and finance*, pp. 250-1.

(31) *AA Big Road Atlas of Britain* (1985), p.30.

(32) Chaloner, 'Salt in Cheshire', pp. 61-2.

(33) Wanklyn, *Shrewsbury boats*, pp. 49-50.

(34) Hughes, *Administration and finance*, pp. 177-80.

(35) Chaloner, 'Salt in Cheshire', p. 70.

(36) Hughes, *Administration and finance*, pp. 225-6, 379; Berry, 'Borough of Droitwich', p. 53; *V.C.H. Worcestershire, volume II*, pp. 260-1.

(37) Westerfield, *Middlemen*, p. 244.

(38) Nef, *Coal industry*, pp. 175n., 179; Hughes, *Administration and finance*, p. 405.

(39) Berry, 'Borough of Droitwich', pp. 49-50; Nash, *Worcestershire*, p. 300n.

(40) Berry, 'Borough of Droitwich', pp. 49-50.

(41) The origins of the vessels suggest strongly that this was Worcestershire brine. Plot, *Staffordshire*, p. 93 says that Cheshire brine yields one fourth salt, and Houghton, *Husbandry*, p. 83 says that Worcestershire salt takes about twice as long to boil as Cheshire. It may be assumed therefore that Worcestershire brine rendered about one eighth salt. The total quantities of brine carried have therefore been divided by eight then converted to bushels in the same way as described for salt above.

(42) Hughes, *Administration and finance*, p. 233.

(43) The home port of the boat is not given in this year, and there is no information to permit a calculation of how many loaves might have been included in one bushel.

(44) Houghton, *Husbandry*, pp. 90-1.

(45) Defoe, *Tour*, vol. ii, p. 261.

(46) Hughes, *Administration and finance*, p. 253; Gaut, *Worcestershire agriculture*, pp. 115-16.

(47) Hughes, *Administration and finance*, p. 250.

(48) Hughes, *Administration and finance*, p. 379; Berry, 'Borough of Droitwich', p. 53.

(49) Hughes, *Administration and finance*, p. 380.

(50) Defoe, *Tour*, vol. 2, p. 261.

(51) Langton, *Geographical change*, pp. 100-1.

(52) Ellis, 'Tyneside salt', pp. 50-8.

(53) Willan, *Coasting trade*, p. 102.

(54) Hadfield, *West Midlands*, pp. 60-2.

(55) Crouch, *Complete View*, pp. 334-8.

(56) Hughes, *Administration and finance*, pp. 199, 216, 236.

(57) Jack, *Trade and industry*, p. 89-90.

(58) Burghall's diary, quoted in *V.C.H. Worcestershire, volume II*, p. 260.

(59) Nash, *Worcestershire*, p. 298.

(60) Berry, 'Borough of Droitwich', pp. 51-2. Wanklyn, 'Shrewsbury boats', p. 50, takes this figure to relate to the early 1690s.

(61) See above; data from Willan, *Coasting trade*, p. 101-2.

(62) Houghton, *Husbandry and trade*, vol. II, pp. 104-6.

(63) Wanklyn, 'Shrewsbury boats', p. 50.

(64) Ellis, 'Tyneside salt', pp. 53-8 gives shipments on the Weaver as 15,000 tons (ie about 600,000 bushels).

(65) Nash, *Worcestershire*, p. 300.

(66) Ellis, 'Tyneside salt', pp. 53-8.

(67) One additional entry has been discounted here because the shipment size is so tiny: 4 gallons (half a bushel) of rock salt brought from Minehead, perhaps for some very specialist purpose.

(68) Dyer, *Worcester*, p. 63.

(69) Nash, *Worcestershire*, p. 298.

(70) Stamper, 'Shropshire salt', p. 77; Wanklyn, 'Shrewsbury boats', p. 49 does not consider this possibility.

(71) Wanklyn, 'Shrewsbury boats', p. 49 suggests additional pointers to this: that where white salt was mentioned on Shrewsbury cargoes it was usually with rock salt, and that salt did not appear near the end of the cargo manifest in the Port Books as he believes did other goods collected *en route*.

(72) None of it was rock salt, and the cargoes of the Duchess were regularly made up largely of goods which can be identified as ones collected along its route.

(73) Davies, 'Economic history of Bewdley' in over 100 pages devoted to the river trade does not discuss salt, and omits it from his table of goods carried downstream, p. 253. His study ended in 1700, but it is clear from the Port Books that the growth of the salt trade was a significant element of change in Bewdley's river trade in the last decade of the seventeenth century and in 1666. Fisher and Pagett, 'Transportation and communication in Bewdley', also omit to mention the salt trade.

(74) As the industrial port for the Black Country, Bewdley's most common other cargoes were pot clay and iron, as well as more fragile goods such as glass.

(75) The Jackson family, who operated boats from Brockweir, also operated from Bridgnorth with boats going back and fore from

the Wye valley. The most important cargoes upstream on the Brockweir boats were iron, for use in the Black Country and Shropshire forges and foundries, and copper and brass which would have been going to Birmingham and other locations in the west midlands.

(76) Davis, *English shipping*, pp. 235-6; Fisher, 'South-west and the Atlantic trades', p. 9 says Bristol owned 12 of the 207 vessels which cleared England for Newfoundland; Coull, *Fisheries of Europe*, p.79.

(77) Willan, *Coasting trade*, pp. 101-2. Measures have been converted according to the same rules as above.

(78) Nash, *Worcestershire*, p. 300. It is difficult to imagine Bristol failing to take a leading share in such an export trade, although other ports of the Bristol Channel may well have been involved.

(79) Jack, *Trade and industry*, p. 113. Soapmaking was certainly a very important consumer of soap in Liverpool towards the end of the eighteenth century: Langton, *Geographical change*, p. 173.

(80) Davis, *English shipping*, p. 229, from Portugal, 'a large tonnage of salt went to Bristol and the south-western ports.'

(81) Willan, *Coasting trade*, p. 102, quoting Liverpool Port Books.

(82) Willan, *Coasting trade*, p. 185.

(83) This may be less than was actually carried. Whereas the Bristol books record 1 ton, 2 hogsheads and 2 barrels (about 62 bushels) being carried up stream to Gloucester, the Gloucester Port Books record 1 ton, 17 barrels and 2 barrels (about 116 bushels). Either there has been a small error or else the Bristol books are less thorough than Gloucester's in recording traffic.

(84) Willan, *Coasting trade*, p. 101.

(85) Willan, *Coasting trade*, pp. 101-2.

(86) Hadfield, *South Wales and the Border*, pp. 184-6.

(87) For example in 1699 a Hereford boat took 6 tons (240 bushels). A Monmouth boat carried 500 bushels in 1715, and 15 voyages of Monmouth boats carried another 14,936 bushels in 1722. Brockweir boats were regular carriers.

(88) Andrews, 'Chepstow', pp. 98-100, saw the 1690s as a decade of discontinuity in the development of Chepstow's trade in response mainly to improved navigation of the Wye and the development of metals industries in the lower valley.

(89) Willan, *Coasting trade*, p. 102.

(90) George, *'Pembrokeshire sea-trading', p. 25.*

(91) In the period 1709-19: Williams, 'Port Books of Swansea and Neath', p.207.

(92) Davies, *South Wales prior to 1800*, p. 116.

(93) Quoted in Davies, *South Wales prior to 1800*, p. 153.

(94) Davies, *South Wales prior to 1800*, p. 63.

(95) Davies, *South Wales prior to 1800*, pp. 62-3. Pembrokeshire exported coastally and overseas about 19 shipments of herrings a year in the 1690s: George, 'Pembrokeshire sea-trading', pp. 15-21 (reprint pagination).

(96) Coull, *Fisheries of Europe*, p. 63.

(97) Fisher, 'South-west and the Atlantic trades', p. 9.

(98) Stern, 'Fish marketing', pp. 70-2.

(99) Defoe, *Tour*, vol. I, p. 261.

(100) Hadfield, *South-west England*, pp. 26-7, 83.

(101) Hoar and Company records, Chancery Masters Exhibit, PRO C104/12, parts 1 and 2, eg waste book pp. 260, 272. I am very grateful to David Hussey for this reference.

(102) Willan, *Coasting trade*, p. 170.

(103) Willan, *Coasting trade*, p. 101.

(104) Willan, *Coasting trade*, p. 168.

(105) There were established rock salt refineries at Bideford, Hughes, *Administration and finance*, p. 237.

(106) Fisher, 'South-west and the Atlantic trades', p. 8; Davis, *Shipping industry*, p. 97.

(107) 38 Geo. 3 C. 89 s. 104 (1798).

(108) Assuming 224 lb of salt to the bushel.

(109) Davis, *English shipping*, p. 235.

(110) Stern, 'Fish marketing', pp. 72-4.

(111) This is testified in many sources, for example, Davis, *English shipping*, p. 229; Willan, *Coasting trade*, pp. 165, 168, 171, 179; George, 'Pembrokeshire sea-trading', p. 21.

(112) Stern,'Fish marketing', pp. 72-4.

(113) Coull, *Fisheries of Europe*, p. 71.

(114) Hughes, *Administration and finance*; Westerfield, *Middlemen*, pp. 243-5.

(115) Hoar and Company records, PRO C104/12 Parts 1+2, Cellar Book pp. 28, 30; Waste Book, pp. 260, 374. I am grateful to David Hussey for this reference.

(116) The Jacksons had Brockweir and Bridgnorth boats in 1705 and 1706, but in 1707 a large number of their voyages were from Worcester. After 1707 Bridgnorth boats no longer appeared. Edward and William Jackson were listed in the Bridgnorth Poll Book of 1727, but both were said to be resident in Worcester: personal communication from Dr Malcolm Wanklyn.

(117) Cox and Wakelin, 'Data derived', pp. 137-8.

(118) The lists are given in Hughes, *Administration and finance*, p. 379n.

(119) The name Edward Wheeler appears in both sources, but he did not carry salt on the river in 1697. Samuel Harrisson was a salter and a family of Harrissons was prominent in the trade from Tewkesbury and Evesham in the 1690s, however they were not recorded as carrying any salt in 1697.

(120) The Baltick Merchant of 350 tons, which was taken by the Spanish in 1740. See the further discussion of Prankard in the next chapter.

(121) The *Betty* and the *Peace*, which seem to have been connected with the Oakes family.

(122) The *Betty* and the *Sarah*.

(123) The eighth was on the Betty to Chepstow with wheat, barley, hops and cider.

(124) He made a voyage to Padstow in 1722 and one to Whitehaven in 1707.

(125) PRO E134, 1, Geo. 2., Hil. 4.

(126) Vincent Stuckley was the principal proprietor at Droitwich in 1818: Hughes, *Administration and finance*, pp. 363-4, 380.

(127) *The western flying post; or Sherbourne and Yeovil mercury, and general advertiser*, XXXV, 1813 (3 November 1783). I am very grateful to Dorian Gerhold for this reference.

Notes to Chapter 6: The trade in tobacco

(1) MacInnes, *Tobacco trade*, pp. 2, 150.

(2) Davis, 'Foreign trade 1660-1700', p. 80 (reprint pagination).

(3) Minchinton, *English overseas trade*, p. 21.

(4) Figures calculated from tables in Davis, 'Foreign trade 1660-1700', pp. 95-8 (reprint pagination).

(5) MacInnes, *Tobacco trade*, p. 183.

(6) MacInnes, *Tobacco trade*, p. 130.

(7) MacInnes, *Tobacco trade*, p. 132.

(8) Hill, *Reformation to industrial revolution*, p. 159.

(9) The best accounts of this are MacInnes, *Tobacco trade*, pp. 86-129; Thirsk, 'Tobacco growing'. The subject is discussed further in the context of the Severn valley below.

(10) Davis, 'Foreign trade 1660-1700', pp. 96-7.

(11) Beckett, *Coal and tobacco*, passim.

(12) MacInnes, *Bristol: a gateway of empire*, p. 126.

(13) Minchinton, *Overseas trade*, pp. 33-4.

(14) Davis, *English shipping industry*, p. 95.

(15) MacInnes, *Tobacco trade*, pp. 51, 132, 161-3; Williams, *Contraband cargoes*, p. 161.

(16) MacInnes, *Tobacco trade*, pp. 54, 58.

(17) MacInnes, *Tobacco trade*, pp. 55-6, 132, 161-3.

(18) Crouch, *Complete view*, pp. 347-8.

(19) 10&11 Gul. 3, c. 21, s. 29; Thirsk and Cooper *Economic documents*, p. 699.

(20) Willan, *Inland trade*, p. 82.

(21) MacInnes, *Tobacco trade*, p. 73.

(22) This is discussed further below. Cole, 'Eighteenth-century smuggling', p. 139 (reprint pagination).

(23) Williams, *Contraband cargoes*, p. 94.

(24) Rees, *Cyclopaedia*, 'Tobacco'; Culpepper, *Herbal*, p. 372.

(25) Quoted in Williams, *Contraband cargoes*, p. 66.

(26) Spufford, *Great re-cloathing*, p. 6.

(27) Willan, *Inland trade*, p. 100.

(28) Williams, *Contraband cargoes*, p. 67.

(29) Willan, *Inland trade*, p. 93.

(30) Inventories from the collection of the Portbooks Programme, pers. comm. Nancy Cox: John Tuff, mercer, of Buckland St. Mary, Somerset, 1690; Robert Wales, grocer, of Norwich, 1666. See also Trinder and Cox, *Yeomen and colliers*, p. 38 and inventories listed there.

(31) Crouch, *Complete view*, pp. 347-8.

(32) Dodd, *Days at the factories*, pp. 117-27, a nineteenth century account of these processes seems to be the best available, but it is not contradicted by the evidence for the earlier period contained in probate inventories.

(33) MacInnes, *Tobacco trade*, p.60.

(34) Minchinton, 'Trade of Bristol in the eighteenth century', p. 15.

(35) Minchinton, *English overseas trade*, pp. 33-5.

(36) Fisher, 'South-west and the Atlantic trades', p. 9.

(37) MacInnes, *Tobacco trade*, pp. 86-127.

(38) Thirsk, 'Tobacco growing', pp. 271-2.

(39) Thirsk, 'Tobacco growing', pp. 273-81. The counties involved in 1665 were Oxfordshire, Sussex, Gloucestershire, Worcestershire, Herefordshire, Warwickshire, Wiltshire, Shropshire, Staffordshire, Somerset, Monmouthshire, Radnor, Montgmeryshire, and Denbighshire.

(40) MacInnes, *Tobacco trade*, pp. 122-4.

(41) In the mid 1690s the price of white salt at Droitwich was about 6d. per bushel of 56lb. (Hughes *Administration and finance* pp. 226), and about ten years earlier the wholesale price of tobacco in Lancaster was 2d. per lb. The retail price of the same tobacco was 6d. (Willan, *Inland trade*, p. 93). The roll tobacco in a shop in Montgomeryshire in 1694 was valued at 7.5d. per lb. (Jenkins, 'Llanfyllin shopkeeper', p. 54.) These prices are not strictly comparable, and prices for both commodities varied remarkably over the whole period studied. Nevertheless, they provide some criteria for comparison.

(42) The terms searched for were as follows: 'Barbados tobacco', 'bulk tobacco', 'cut tobacco', 'damnified tobacco', 'decayed tobacco', 'leaf tobacco', 'roll tobacco', 'Spanish tobacco', 'tobacco', 'tobacco and bulk', 'tobacco and bulls', 'twist tobacco', 'Virginia cut tobacco', 'Virginia roll tobacco', 'Virginia tobacco'.

(43) Terms related to tobacco which have been excluded from this study include 'cut stems of tobacco', 'cut tobacco stalks', 'snuff', 'stems and tobacco dust', 'tobacco cane', 'tobacco dust', 'tobacco ends', 'tobacco stubs', and 'engines to press tobacco'.

(44) McInnes, *Tobacco trade*, pp. 132, 161.

(45) McGrath, 'Merchants and merchandise', pp. 290-1.

(46) Many inventories of mercers who stocked tobacco also contained things such as tobacco knives and presses: for instance the inventory of Edward Waine of Tenbury, Worcestershire in 1677, or that of John Tuff of Buckland St. Mary, Somerset, in 1690. The latter had 'knives and other materials belonging to the cutting and rolling of tobacco'. Pers. Comm. Nancy Cox from the collection of transcribed retailers inventories held by the Portbooks Programme, Wolverhampton Polytechnic.

(47) With the exception of the hogshead, which is discussed more fully in the text, the conversions used were as follow. Cwt = 112 lb; Quarter = 28 lb; Cask = 224 lb (Zupko, *Dictionary*, p. 33); Small cask = 112 lb (only appears once in all the sample years, so it has been assumed simply that it may have been about half a cask); Roll = 20 lb (this is an important measure in that it was used for the only shipment of tobacco in 1647 and for one in 1656, however the only evidence found for its weight equivalent dates from the mid-nineteenth century and states that it was most commonly 20 lb for twist tobacco and could be as little as 6-8 lb or even less: Fairholt, *Tobacco*, pp. 310-11. An entry in a Bideford coastal Port Book for 1697 refers to 400 lb of tobacco in 18 rolls, ie at 22.2 lb each: pers. comm. from David Hussey, quoting PRO E190/971/11/5/60. Rolls could be smaller, and the inventory of Kenrick Eyton, mercer of Chester, in 1624 contained rolls of 8, 13 and 18 lb: pers. comm. Nancy Cox); Box = 336 lb (Zupko, *Dictionary*, p. 23 states the box was a non standard measure. As it was used only once in the sample years, it has been assumed the same as the bag, below); Chest = 336 lb (MacInnes, *Tobacco trade*, p. 151.); Ton = 2,240 lb (this was used only once, in 1674); Bag = 336 lb (Zupko, *Dictionary*, p. 11 states that for most commodities the bag could contain from 2 to 4 cwt); Truss = 56 lb (Zupko, *Dictionary*, gives a truss of hay in 1708 as 56 lb. It was used only once, in 1674.); Firkin = 56 lb (Zupko, *Dictionary*, p. 62 gives the butter firkin as 56 lb. It was used only once, in 1684); Pack = 240 lb (Zupko, *Dictionary*, p. 116 gives this as the weight of the wool pack. 18 were carried in 1674, but at no other time.) 10 & 11 Gul. 3, C. 21, S. 29 stated that from 29 September 1700 tobacco was not to be imported in bulk but shipped only in casks, chests, or cases, each of which '...shall contain two hundred Weight of neat Tobacco in the least...'. The following additional measures were used for the downstream trade in returned tobacco. Barrel = 261 lb (MacInnes, *Tobacco trade*, p. 151.); Kilderkin = 130 lb (a half barrel according to Zupko, *Dictionary*, p. 91).

(48) The Port Books for 1684 have been used to provide a ration between hogsheads and pounds, since from this time onwards there were many tobacco cargoes described in terms of their containers and also their weight equivalents. This year was chosen as being closest to the years of the later seventeenth century when the problem of converting the hogshead arises. Twenty values in upstream voyages showing clear ratios between the pound and the hogshead were selected. The range of variation in these examples was from 201 lb to the hogshead to 900 lb. The mean was 327 lb, and the median value 351 lb. The modal class was 300-399 lb, and this applied to 12 out of the 20 occurrences. The conversion figure of 350 lb was chosen as the middle of the modal class and because it exceeded the mean, thereby acknowledging slightly the much higher values assumed in sources dealing with overseas trade.

(49) In the mid nineteenth century it was considered to be by custom 1,000 lb with a legal minimum of 900 lb (Fairholt, *Tobacco*, p. 301; Walker, *Tobacco pipes*, p. 36 refers to hogshead brought into Bristol of 400 lb each; one hogshead used in Virginia in the late seventeenth century was 450 lb, but it was specified in an excise order of 1661 as 560 lb or less and was converted in a House of Lords report in 1704 as 560 lb also (MacInnes, *Tobacco trade*, pp. 151, 162, 186.

(50) Williams, *Contraband cargoes*, p. 66.

(51) William, *Contraband cargoes*, p. 68.

(52) Williams, *Contraband cargoes*, pp. 92, 110, 124-5.

(53) Calculated from figures in Beckett, *Coal and tobacco*, p. 107.

(54) Williams, *Contraband cargoes*, p. 84.

(55) Williams, *Contraband cargoes*, pp. 63-146.

(56) Cole, 'Smuggling', p. 138 (reprint pagination).

(57) Cole, 'Smuggling', pp. 138, 124 (reprint pagination).

(58) Williams, *Contraband cargoes*, p. 94.

(59) Calculated from Minchinton, 'Bristol in the eighteenth century', p. 15.

(60) MacInnes, *Tobacco trade*, pp. 110-11.

(61) Owing to laws passed in 1624, 1627 and strengthened in 1630, 1634 and 1637: MacInnes, *Tobacco trade*, pp. 54-8.

(62) For example in 1706 the Gloucester Port Books have a cargo of two hogsheads shipped from Bewdley for Bridgwater which was recorded as having come by land from London.

(63) MacInnes, *Tobacco trade*, p. 58; McGrath, 'Merchants and merchandise', pp. 284-5.

(64) MacInnes, *Tobacco trade*, p. 58.

(65) McGrath, 'Merchants and merchandise', pp. xix-xx.

(66) McGrath, 'Merchants and merchandise', p. xx believes Bristol was prospering again by about 1654.

(67) MacInnes, *Tobacco trade*, pp. 139-40.

(68) MacInnes, *Tobacco trade*, p. 67.

(69) See the discussion of salt in 1666 above; De Vries, *Economy of Europe*, pp. 102-3; Davis, *English shipping*, pp. 315-37; Willan, *River navigation*, p. 110.

(70) MacInnes, *Gateway of empire*, p. 249.

(71) See the discussion of units of measurement in tobacco above. The first figures assumes a hogshead contained on average 350 lbs, the second that it contained 500 lbs.

(72) Minchinton, *Overseas trade*, p. 12.

(73) or 676,157 lbs if a 500 lb hogshead is assumed instead of one of 350 lbs.

(74) Minchinton, *Overseas trade*, p. 13.

(75) Ogg, *England in the reigns of James II and William III*, p. 297.

(76) Minchinton, *Overseas trade*, pp. 13-14.

(77) MacInnes, *Tobacco trade*, p. 62.

(78) Davis, *Shipping industry*, p. 270.

(79) MacInnes, *Tobacco trade*, p. 163.

(80) Ashton, *Economic fluctuations*, p. 183.

(81) Ashton, *Economic fluctuations*, pp. 181-2.

(82) Defoe, *Tour*, vol. ii, pp. 255-9.

(83) Williams, *Contraband cargoes*, p. 93.

(84) Davis, 'Overseas trade 1700-1774', pp. 119-20 (reprint pagination). Recorded imports of tobacco grew from £249,000 to £263,000 between 1699-1701 and 1722-4, but re-exports actually fell in value. It is difficult to extrapolate from these values to actual quantities carried, but retail tobacco prices seem to have been reasonably comparable at around these two dates.

(85) Figures calculated from raw data in Minchinton, 'Bristol in the eighteenth century', p. 15.

(86) Willan, *Coasting trade*, p. 108.

(87) McGrath, 'Merchants and merchandize', p. 287. The figures given were 1 chest, 3440 hogsheads, 4199 rolls, 120 hand rolls, and 780 small rolls. These figures can only be converted very roughly to lbs. This has been done on the basis of the assumptions of weights and measures already given and with the additional guess that if rolls were 20 lbs, hand rolls and small rolls may be assumed to have been something like half the size on average.

(88) McGrath, 'Merchants and merchandise', p. 294.

(89) Minchinton, 'Bristol in the eighteenth century', p. 15.

(90) There are several explicit references in the Gloucester Port Books to downstream cargoes having come from London or Liverpool overland, for example in 1704 and 1705, and it seems likely that some downstream tobacco going at other times was coming from these sources. This is discussed more fully below.

(91) Davis, 'Foreign trade 1660-1700', p. 80.

(92) Quoted in Thirsk, 'Tobacco growing', p. 281.

(93) MacInnes, *Tobacco trade*, pp. 112-13.

(94) Bridgnorth boats and one of Redbrook which regularly traded with Bridgnorth.

(95) George, 'Pembrokeshire sea-trading', p. 29.

(96) Willan, *Coasting trade*, p. 168, quoting Watkins, *Bideford*, p. 66, written in 1795.

(97) Willan, *Coasting trade*, pp. 108, 168.

(98) Willan, *Coasting trade*, p. 108.

(99) Pers. comm. David Hussey.

(100) Pers. comm. David Hussey. I am grateful for the use of the Portbooks Programme's several databases of Bristol Channel trade for this information.

(101) Glos. R.O. D1559 Z1, pp. 22-30. This account is discussed more fully when examining the organisation of the tobacco trade below.

(102) Carrying 67 rolls in 1647, see above.

(103) These were 10% below and 27% above the mean. See above.

(104) MacInnes, *Tobacco trade*, p.185.

(105) Davis, *English shipping*, pp. 285-6. Davis contradicts himself somewhat on times of departure from America, but the interpretation given here seems best to fit the evidence he presents.

(106) Quoted in MacInnes, *Tobacco trade*, p. 186.

(107) Davis, *English shipping*, pp. 285-6.

(108) Minchinton, 'Trade of Bristol', pp. 22-3, quoting PRO E190/1206/3.

(109) Davis, *English shipping*, pp. 285-6.

(110) I am particularly grateful to David Hussey for his valuable suggestions regarding this section.

(111) Minchinton, 'Trade of Bristol', p. 104n.

(112) Minchinton, 'Trade of Bristol', pp. 103-4; the London textile merchant Robert Gray spent a great deal of time selling goods at the Bristol fairs in the early part of the sixteenth century: Willan, *Inland trade*, pp. 122-6.

(113) Annual or bi-annual fairs of this sort usually attracted people from long distances, and the St. James's and St. Paul's fairs at Bristol drew customers from all over the west country and south Wales: Clark and Slack, *Towns in transition*, pp. 19, 49.

(114) Rowlands, *Masters and men*, p. 74.

(115) Latimer, *Annals of Bristol in the eighteenth century*. I am grateful to Joan Day for help with this reference.

(116) Wanklyn, 'Shrewsbury boats', p. 52; Cox and Wakelin, 'Data derived', pp. 137-8.

(117) Glos. R.O. D1086 B15.

(118) Glos. R.O. D1559 Z1, pp. 22-30; see also the short article based on this diary, Palser, 'A Severnside merchant'.

Notes to the Conclusion

(1) Willan, *River navigation*; Hadfield, *British Canals* and volumes in the Canals of the British Isles Series; Alsop, 'River Nene'; Barker, 'Sankey navigation'; Cohne, 'Non-tidal Wye'; Course, *Itchen Navigation*; Cross, 'Salisbury Avon'; Denton and Lewis, 'River Tem'; Duckham, *Yorkshire Ouse*; Duckham, *Inland waterways of east Yorkshire*; Hopkinson, 'South Yorkshire and north Derbyshire'; MacMahon, 'Beverley and its beck'; Sharman, 'Sandys and the Warwickshire Avon'; Summers, *Great Ouse*; Tann, 'Yorkshire Foss'; Thacker, *Thames highway*; Unwin, 'Aire and Calder'; Willan, 'Great Ouse'; Willan, 'Bath and the Avon'; Willan, 'Chester and the Dee'; Willan, 'Witham to the Yare'; Willan, 'Salisbury and the Avon'; Willan, 'Weaver'; Willan, 'Yorkshire river navigation'; Willan, *Don navigation.*

(2) Beckwith, *Gainsborough*; Wakelin, 'River Tone'; Wanklyn, 'Shrewsbury boats'; Jones, 'Lea valley'.

(3) Boyes and Russell, *Canals of eastern England*, pp. 133-40.

(4) The Port Books for Hull only infrequently recorded vessels of York passing out of the port. However, in 1684 vessels sailed from Rochester in Kent up the Ouse to York. Willan interpreted a reference in E190/316/07 to the Mayflower of York trading from Hull to Newcastle as evidence that the home port of a vessel was not its place of departure, but this can equally be taken to show that it was indeed sailing from York to Newcastle, just as vessels on the Severn sailed from Bridgnorth to Bridgwater. Willan, *Coasting trade*, pp. 139, 217.

(5) Paget-Tomlinson, *Canal and river navigations*, pp. 139, 200-1, 230-1.

(6) Braudel, *Wheels of commerce*, pp. 357-61; Hadfield, *World canals*, pp. 25-30, 38-47.

(7) Paget-Tomlinson, *Canal and river navigations*; Hadfield, volumes in Canals of the British Isles series; Willan, *River navigation.*

(8) Willan, *River navigation*, p. 133.

(9) Dyos and Aldcroft, *British transport*, pp.37-45; Hadfield, *British canals*, pp. 16-22; Jackman, *Development of transportation*, pp. 157-64; Rolt, *Navigable waterways*, pp. 1-5; this view could be said to be inherent in Willan's work, *River navigation*, which takes river improvement, not in fact river navigation, as its subject.

(10) Freeman, 'Introduction', p. 1; Chartres, 'Road carrying'; Freeman, 'Road transport'; Pawson, *Transport and economy.*

(11) Gerhold, 'London carrying', pp. 400-3.

(12) Nef, *Coal industry*, vol I, p. 179.

(13) Willan, *Coasting trade*, p. 145.

(14) Dyos and Aldcroft, *British transport*, pp.37-45; Hadfield, *British canals*, pp. 16-22; Jackman, *Development of transportation*, pp. 157-64; Rolt, *Navigable waterways*, pp. 1-5.

(15) Telford's description is in Plymley, *General View*, pp. 317-33. Diary of John Kelsall, Friend's House Library. I am grateful to Dr Melvin Humphreys for this reference.

(16) *Gloucester Journal*, 24 October 1758.

(17) The one month when only three voyages were recorded was April 1704. There were two other months during which there were only three voyages, but in both cases this was because there had been a voyage on the 31st of the preceding month, and so the regularity of service was maintained.

(18) Chartres, *Internal trade*, pp. 41-2, expresses the widespread view by saying, 'While there was some overlap between land and water carriage... it is important not to assume that the demand for transport services was homogeneous', and speaks of low value to volume goods only. Freeman's discussions of the functions of transport modes in the industrial revolution focus on the differences in their characteristics and suitability for different goods, suggesting that water transport was advantageous mainly for bulky, low-value goods which were not needed urgently, Freeman, 'Introduction', pp. 12-17. Dyos and Aldcroft, *British Transport*, pp. 43-5 are concerned only with coal and industrial goods as commodities of river carriage. Duckham's arguments for the significance of water transport in the industrial revolution ignore goods other than coal and agricultural produce, Duckham, 'Canal and river navigations', pp. 128-35. Willan's account of cargoes carried on English rivers, in the most extensive study of the subject yet carried out, is almost exclusively concerned with coal, corn and other bulky goods,

River navigation, pp. 1-2, 123-6.

(19) Avery, 'Brass and copper', p. 52.

(20) 425 bags, 10.5 tons, 1 hogshead and 1 cask.

(21) Chartres, *Internal trade*, p. 27.

(22) Chartres, *Internal trade*, p. 37.

(23) Cox and Wakelin, 'Data derived', p. 136.

(24) This is in accordance with Clarkson's interpretations of the leather industry in the period: Clarkson, 'Organisation of leather industry'; Chartres, *Internal trade*, pp. 30-1.

(25) Cox and Wakelin, 'Data derived', pp. 139-40; Avery, 'Brass and copper traffic, pp. 11-18, 42-50.

(26) Holderness, *Pre-industrial England*, p. 145.

(27) Perry, 'Description of the Severn', p. 278, wrote that the numbers of vessels on the Severn had increased by 6% just between 1756 and 1758.

(28) Willan, *Coasting trade*, contains repeated references to trade having declined before his samples taken in the 1730s and 1740s, for example pp. 68, 70, 77, 93, 135, 173. On p. 173 Willan notes from the Bristol Port Books that 'In the eighteenth century Bristol's outward shipments became much less concentrated on Gloucester', having only 34 in 1735 compared with 221 in 1685. This misinterpretation is especially surprising given that on p. 175 he states that in 1736, 273 voyages were recorded in the Gloucester books as going to Bristol.

(29) Chartres, *Internal trade*, p. 37.

(30) Everitt, 'Marketing of agricultural produce', p. 136.

(31) Cox and Wakelin, 'Data derived', p. 138.

(32) The Port Books record 139 tons or 87% of Houghton's figure, but consumption of copper in Bristol and London must have been more than that remaining: Avery, 'Brass and copper', p. 43.

(33) In 1699, for example, those for Bridgwater were more complete in that they recorded let passes, but those for Bristol recorded no inward voyages, and those for Chepstow omitted many voyages and had incomplete cargo descriptions.

(34) A valuable discussion of the limitations of the approach in historical geography is given in Baker, *Progress in geography*, chapter 1.

(35) Guelke, 'On rethinking historical geography'.

(36) Laurence Sterne, writing as Tristram Shandy on his own autobiography. *The Life and Opinions of Tristram Shandy, Gentleman*, 1759-67, reprinted (Harmondsworth, 1967), p. 65.

BIBLIOGRAPHY

i. Manuscript sources

The principal sources used in this thesis are listed below. As is often the case, many more archives were searched than provided documents eventually used. I am also grateful for the patience and help of archivists at: Bewdley Museum, the Bodleian Library, Bristol City Library, Emmanuel College Cambridge, Hereford Record Office, Ironbridge Gorge Museum Library, Kidderminster Public Library, Lichfield Joint Diocesan Record Office, National Maritime Museum Library, National Register of Archives, the Public Record Office at Kew, Shrewsbury Local Studies Library, and Shropshire County Record Office.

It would be impossible to give references to all Port Books entries used in each analysis; for example one table of outward shipments of salt in chapter 5 uses 1,933 individual entries. However the books used can be found by reference to table 1.1. Where reference is made to particular entries, the identification number is given to find the entry in both the documents and the Portbooks Database. These are in the form 'PRO box number/PRO piece number/folio number/entry number for each folio'.

The database itself will be available for other scholars to re-examine and develop the findings of this thesis. In addition to being used at Wolverhampton Polytechnic, a copy will be deposited at the ESRC Data Archive. In the longer term, it is hoped it will be possible to publish the database and make it widely available in libraries and record offices.

Bristol Record Office
MS 26226: Letters from Samuel Lowder, clerk of Port of Bristol, to William Prattinton of Bewdley 1770-6.

Gloucester County Record Office
D215(16): Articles of agreement between merchants of Newnham, 1767.
D1559 Z1: Journal of a merchant at Newnham 1783, see also Palser, M.A.R., 'Severnside merchant'.
D2079 III/112: papers re: warehouses on the the quay in Tewkesbury 1749.
D1086 B15: account book of a Bristol merchant, John Blagden, 1755-6.
Wills and probates 1709 100, 167: probate and will of William Lewis of Gloucester, sailor, 1709.
Wills and probates 1728 21, 206: probate and will of Edward Owen of Gloucester, mariner, c1728.
PC 1011: Account book of a Tewkesbury merchant, 17th C. Xerox of a badly damaged original.
ROL G4: Ripley, P., ed., 'The freemen of Gloucester: a calendar of the registers for 1653-1838'.
GBR c10/3 Gloucester Borough Apprentice Register 1668-1742
GBR F4/3-15: Index to Gloucester Borough Steward's, Chamberlain's and Treasurer's accounts.
GBR G14/1-5: Misplaced records of Bristol Corporation, mid seventeenth century.
GBR F10/4: Transcript of Exchequer decrees and orders 5 Cha I Hil folio 214, 1629/30.
GBR: Subject index to Gloucester Borough Custumals and Minute Books, 1565-1836.

Much Wenlock Borough Archive
Q1/6/1-12: Quarter Sessions Bastardy Examinations Book, 1711-1836.
Q1/3-5: Quarter Sessions Examinations of settlement,1729-1840.
B3/1/1 and 2: Much Wenlock Borough Minute Books, 1495-1810.
Q1/14/1-433: Quarter Sessions Coroner's Inquisitions.

National Library of Wales
Pitchford Hall MSS Sir Francis Ottley letters Box 1: Proposal for improving the navigation of the Severn n.d. (with letter 22/2/1771).
Esgair and Pantperthog MSS 1055: order from Lord Admiral of England re embargo on Severn, 5/3/1705/6.
Powis Castle 11646: notes of action re roads to new quay near Welshpool, n.d. (early seventeenth century).
Powis Castle 3928: account of lead sold at New Quay (Pool Quay) 1753.
Powis Castle 3532-3: accounts of lead carriage on Severn 1748/9.
Powis Castle 1251: petition for Custom House to be moved from Aberystwyth to Aberdovey.
Powis Castle 21102-4: trade at Aberdovey.
Powis Castle 9212: abstracts of letters re New Quay (Pool Quay) smelthouse and lead trade 1725-33.

Public Record Office, Chancery Lane
E190 Exchequer Port Books: books for Gloucester, Bristol, Chepstow, Bridgwater, Swansea and Neath, Liverpool, Chester, London, Hull, and King's Lynn.

E134 Exchequer Depositions by Commission: descriptive lists 1628-1754, and depositions 1 Geo 2 Hil 4; 16 Chas 2 East 9; 4/5 Ann Hil 25.

Staffordshire County Record Office
Aqualate Papers D(W)1788: navigation of Rivers Stour and Salwarpe.
Worcester Record Office
b899:31: Foley scrapbooks
705:139BA8397/98 (iii): Account for carriage of coal and salt.

ii. Published Works

Albert, W., *The turnpike road system in England 1663-1840* (Cambridge, 1972).
Aldcroft, D., and Freeman, M., eds., *Transport in the industrial revolution* (Manchester, 1983).
Alford, B W.A., *W.D. and H.O. Wills and the development of the tobacco industry* (1963)
Alsop, J.D., 'The development of inland navigation on the River Nene in the early eighteenth century', *Northants Past and Present*, 7, 3 (1985-6), pp. 161-3.
An alphabet of the poll taken at Gloucester 26 May, 1741 (1741).
Andrews, J.H., 'Chepstow: a defunct seaport of the Severn estuary', *Geography*, XL (1955), pp. 97-107.
Andrews, J.H., 'The Customs Ports of Sussex, 1680-1730', *Sussex Notes and Queries* XIV (1954), pp. 1-3.
Andrews, J.H., 'The Port of Chichester and the grain trade, 1650-1750', *Sussex Archaeological Collections* 92 (1954), pp. 93-105.
Andrews, J.H., 'The Thanet seaports, 1650-1750', *Archaeologia Cantiana* 66 (1954), pp. 37-44.
Andrews, J.H., 'The trade of the port of Faversham, 1650-1750', *Archaeologia Cantiana* 69 (1955), 125-31.
Andrews, J.H., 'Two problems in the interpretation of the Port Books', *Econ. Hist. Rev.*, 2nd ser. IX (1956), pp.119-122.
Armstrong, J., and Bagwell, P.S., 'Coastal shipping', in D.H. Aldcroft and M.J. Freeman, *Transport in the industrial revolution* (1983).
Ashley, M., *England in the seventeenth century* (Harmondsworth, 1952).
Ashton, T.S., *An economic history of England: the eighteenth century* (1955).
Ashton, T.S., *Economic fluctuations in England, 1700-1800* (Oxford, 1959).
Ashton, T.S., *The coal industry of the eighteenth century* (Manchester, 1929).
Ashton, T.S., *The industrial revolution 1760-1830* (1948, reprinted Oxford, 1968).
Astrom, S.-E., *From cloth to iron: the Anglo-Baltic trade in the late seventeenth century, part I, the growth, structure and organisation of the trade* (Helsingfors, 1963).
Astrom, S.-E., 'The reliability of the English Port Books', *Scandinavian Econ. Hist. Rev.*, XVI (1968).
Atkinson, D.R., *Tobacco pipes of Broseley, Shropshire* (1975).
Atkyns, Sir R., *The ancient and present state of Glostershire* (1712).
Atton, H. and Holland, H.H., *The King's Customs*, 2 vols., (1908, 1910).
Avery, W.D., 'Brass and copper traffic on the River Severn 1660-1760', unpublished BA dissertation, Department of History, University of Birmingham (1990).
Baddeley, W. St. C., 'A glass house at Nailsworth (sixteenth and seventeenth century)', *Trans. Bristol and Glos. Archaeol. Soc.*, 42 (1920), pp. 89-95.
Bagwell, P.S., *The transport revolution from 1770* (1974).
Baker, A.R.H., *Progress in Geography* (Newton Abbot, 1972).
Barker, T.C., and Savage, T.C., *An economic history of transport in Britain* (1974).
Barker, T.C., 'Lancashire coal, Cheshire salt and the rise of Liverpool', *Trans. Historic Soc. of Lancs. and Cheshire*, 103 (1951), pp. 83-101.
Barker, T.C., 'The Sankey navigations', *Trans. Hist. Soc. of Lancs. and Cheshire*, C (1948).
Baskerville, S., 'Preferred linkage and the analysis of voter behaviour in eighteenth-century England', *Hist. and Computing*, I (1989), pp. 112-20.
Baugh, G.C., ed., *The Victoria History of the Counties of England: a history of Shropshire, volume 2, Telford* (Oxford, 1985).
Bazeley, W., 'The guilds of Gloucester', *Trans. Bristol and Glos. Archaeol. Soc.*, XIII (1888-9), pp. 260-70.
Beattie, J.M., *Crime and the courts in England 1660-1800* (Oxford, 1986).
Beckett, J.V., *Coal and tobacco: the Lowthers and the economic development of west Cumberland, 1660-1760* (Cambridge, 1981).
Beckwith, L.S., *The river trade of Gainsborough, 1500-1850* (Lincoln, 1968).
Beckwith, L.S., 'The river trade of Gainsborough, 1500-1800', *Lincs. Hist. and Archaeol.*, 2 (1967), pp. 3-20.
Beier, A.L., and Finlay, R., eds., *London 1500-1700: the making of the metrolpolis* (1986).
Bennet, J., *The history of Tewkesbury* (1830).
Benson, D. and Whitehead, G., *Transport and distribution made simple* (1975).
Berg, M., *The age of manufactures: industry, innovation and work in Britain, 1700-1820* (1985).
Berry, E.K, 'The borough of Droitwich and its salt industry, 1215-1700', *Univ. of Birmingham Hist. J.*, 6 (1957-8), pp. 39-61.
Best, H., 'Computing the unmeasurable: estimating missing values in legislative roll call analysis', Denley, P., Fogelvick, S., and

Harvey, C., *History and computing II* (Manchester, 1989), pp. 104-16.
Blakeway, G.S., *The city of Gloucester: its Royal charters of liberties and varying fortunes* (Gloucester, 1924).
Bolton, J.L., *The medieval English economy, 1150-1500* (1980).
Borsay, P., *The English urban renaissance: culture and society in the English provincial town, 1660-1770* (Oxford, 1989).
Bowden, P., *The wool trade in Tudor and Stuart England* (1961).
Bowen, E.G., ed., *Wales: a physical, historical and regional geography* (1957).
Boyes, J., and Russell, R., *The canals of eastern England* (Newton Abbot, 1977).
Braudel, F., *Civilization and capitalism, fifteenth-eighteenth century, volume I, the structures of everyday life*, (Paris, 1979), trans. S. Reynolds (1983).
Braudel, F., *Civilization and capitalism, fifteenth-eighteenth century, volume II, the wheels of commerce* (Paris, 1979), trans. S. Reynolds (1983).
Braudel, F., *Civilization and capitalism, fifteenth-eighteenth century, volume III, the perspective of the world* (Paris, 1979), trans. S. Reynolds (1984).
Brayley, E.W., and Britton, J., *A topographical and historical description of the county of Gloucester...* (n.d., *c.* 1818).
Bridbury, A.R., *England and the salt trade in the later middle ages* (Oxford, 1955, reprinted Westport, Connecticut, 1973).
British Standards Institution *Draft for development: the structure and representation of data for interchange at the application level, part 1, recommendation for syntax and basic principles* (1981).
Brown, P.J., 'Andrew Yarranton and the British tinplate industry', *Historical Metallurgy*, 22 (1988), pp. 42-8.
Buckley, F., 'The early glass-houses of Bristol', *J. of the Soc. of Glass Technology*, 9 (1925), pp. 36-61.
Bund, J.W.W., *The Civil War in Worcestershire 1642-1646; and the Scottish invasion of 1651* (Birmingham, 1905).
Burroughs, W.J., 'Some observations on central England temperature in the sixteenth to nineteenth centuries', *Weather*, 40 (1985), pp. 166-71.
Burt, R., 'Lead production in England and Wales, 1700-1770', *Econ. Hist. Rev.*, 2nd ser. 22 (1969), pp. 249-68.
Burt, R., 'The international diffusion of technology in the early modern period: the case of the British non-ferrous mining industry', *Econ. Hist. Rev.*, 2nd series, XLIV (1991), pp. 249-71.
Burton, J.R., *A history of Bewdley; with concise accounts of some neighbouring parishes* (1883).
Cairncross, A.K., 'In praise of economic history', *Econ. Hist. Rev.*, 2nd ser. XLII (1989), pp. 173-85.
Calvert, A.F., *Salt in Cheshire* (1915).
Cantrill, T.C., and Wight, M., 'Yarranton's works at Astley', *Trans. Worcestershire Archaeol. Soc.*, new ser. 6 (1929), pp. 92-115.
Carson, E., *The ancient and rightful Customs: a history of the English Customs service* (1972).
Carswell, J., *From restoration to revolution: England 1688-1776* (1973).
Carus-Wilson, E.M. and Coleman, O., *England's export trade 1275-1574* (Oxford, 1963).
Chalklin, C., *The provincial towns of Georgian England* (1974).
Chalklin, C.W., *Seventeenth-century Kent: a social and economic history* (Rochester, 1965).
Chaloner, W.H., and Ratcliffe, B.M., eds., *Trade and transport: essays in economic history in honour of T.S. Willan* (Manchester, 1977).
Chaloner, W.H., 'Salt in Cheshire, 1600-1870', *Trans. Lancs. and Cheshire Antiquarian Soc.*, 71 (1961), pp. 58-74.
Chambers, J.D., and Mingay, G.E., *The agricultural revolution, 1750-1880* (1966).
Chambers, J.D., *Population, economy and society in pre-industrial England* (1972).
Chambers, J.D., 'The Vale of Trent 1670-1800: a regional study of economic change', *Econ. Hist. Rev. Supplement* 3 (1957).
Champion, P., 'The Lea Navigation 1767-1867', unpublished Ph.D. thesis, University of London (1978).
Chartres, J.A., *Internal trade in England, 1500-1700* (1977).
Chartres, J.A., 'Food consumption and internal trade', in Beier, A.L., and Finlay, R., eds., *London 1500-1700: the making of the metrolpolis* (1986)., pp. 168-98.
Chartres, J.A., 'Road carrying in England in the seventeenth century: myth and reality', *Econ. Hist. Rev.*, 2nd ser. XXX (1977), pp. 73-94.
Chartres, J., *Agricultural markets and trade, 1500-1750: chapters from the agrarian history of England and Wales 1500-1750, volume 4* (Cambridge, 1990).
Cipolla, C.M., *Before the industrial revolution: European society and economy, 1000-1700* (1976, 2nd edn. 1980).
Cipolla, C.M., ed., *The Fontana economic history of Europe: the emergence of industrial societies*, 2 vols., (1973).
Cipolla, C.M., ed., *The Fontana economic history of Europe: the industrial revolution* (1973).
Cipolla, C.M., ed., *The Fontana economic history of Europe: the sixteenth and seventeenth centuries* (1974).
Clapham, J.A., *A concise economic history of Britain from the earliest times to 1750* (Cambridge, 1949).
Clark, E.A.G., *The Ports of the Exe estuary, 1660-1860: a study in historical geography* (1960).
Clark, G.N., *Guide to English commercial statistics, 1696-1782* (1938).
Clark, P., ed., *County towns in pre-industrial England* (Leicester, 1981).
Clark, P., ed., *The early modern town* (1976).
Clark, P., *The Impact of English towns, 1700-1800* (Oxford,1982).
Clark, P., 'The civic leaders of Gloucester 1580-1800', in Clark, P., ed., *The transformation of English provincial towns 1600-1800* (1984), pp. 311-345.
Clark, P., ed., *The transformation of English provincial towns, 1600-1800* (1984).
Clark, P., and Slack, P., eds., *Crisis and order in English towns, 1500-1700* (1972).
Clark, P. and Slack, P., *English towns in transition, 1500-1700* (1976).
Clark, Sir G., *Early modern Europe from about 1450 to about 1720* (1954, 2nd edn. 1966).

Clarkson, L.A., 'The organisation of the English leather industry in the late sixteenth and seventeenth centuries', *Econ. Hist. Rev.*, 2nd ser. XIII (1960), pp. 245-56.
Clarkson, L.A., *Proto-industrialization: the first phase of industrialization?* (1985).
Clarkson, L.A., *The pre-industrial economy in England 1500-1700* (1971).
Clay, C.G.A., *Economic expansion and social change: England 1500-1700*, 2 vols., (Cambridge, 1984).
Clifford, E.M., 'The Severn as a highway in prehistoric times', *Trans. Bristol. and Glos. Archaeol. Soc.*, LXVIII (1949), pp. 5-13.
Cohne, I., 'The non-tidal Wye and its navigation', *Trans. Woolhope Naturalists Field Club*, XXXV.
Cole, W.A., 'Trends in eighteenth-century smuggling', *Econ. Hist. Rev.*, 2nd ser. X (1958), pp. 395-410, reprinted in Minchinton, W.E., *The growth of English overseas trade in the seventeenth and eighteenth centuries* (1969), pp. 121-43.
Coleman, D.C., *Industry in Tudor and Stuart England* (1975).
Coleman, D.C., *The economy of England 1450-1750* (1977).
Coleman, D.C., 'Proto-industrialization: a concept too many', *Econ. Hist. Rev.*, 2nd ser. XXXVI (1983), pp.435-48.
Conway-Jones, H., *Gloucester Docks: an illustrated history* (Gloucester, 1984).
Conway-Jones, H., 'Gloucester Quay, 1780-1820', *Glos. Hist. Studies*, XIII (1982), pp. 19-22.
Conway-Jones, H., *Working life on Severn and canal: reminiscences of working boatmen* (Gloucester, 1990).
Corfield, P.J., *The impact of English towns, 1700-1800* (1982).
Corfield, P.J., 'A provisional capital in the late sevententh century' in Clark, P. and Slack, P. eds. *Crisis and Order in English Towns 1500-1700* (1972).
Coull, J.R., *The fisheries of Europe: an economic geography* (1972).
Counsel, G.W., *The history and description of the City of Gloucester* (Gloucester, 1829).
Course, E., *The Itchen navigation* (Southampton, 1983).
Court, W.H.B., *The rise of the Midland industries 1600-1838* (Oxford, 1938).
Cox, J., and Cox, N., 'Probate Inventories: the legal background', *Local Historian*, Vol. 16, 3, (Aug 1984), pp 133-45 and vol. 16, 4, (Nov 1984), pp 217-27.
Cox, N. and Cox, J., 'Valuations in Probate Inventories', *Local Historian*, vol. 16, 8, (Nov 1985), pp 467-78 and vol. 17, 2, (May 1986), pp85-100.
Cox, N., 'Imagination and innovation of an industrial pioneer: the first Abraham Darby', *Industrial Archaeol. Rev.*, XII (1990), pp.127-44.
Cox, N. and Wakelin, P., 'Data derived from the Gloucester coastal Port Books 1695-1725', Appendix pp. 136-44 to Cox, N., 'Imagination and innovation of an industrial pioneer: the first Abraham Darby', *Industrial Arch. Rev.* XII (1990).
Cozens-Hardy, B., 'Maritime trade of the Port of Blakeney, Norfolk, 1587-90', *Norfolk Rec. Soc.*, VIII (1936).
Crafts, N.F.R., 'British economic growth, 1700-1831: a review of the evidence', *Econ. Hist. Rev.*, 2nd ser. XXXVI (1983), pp. 177-99.
Crafts, N.F.R., 'English economic growth in the sixteenth century: a re-examination of Dean and Cole's estimates', *Econ. Hist. Rev.*, 2nd ser. XXXIX (1976), pp. 226.
Craig, R., 'Shipping and shipbuilding in the Port of Chester in the eighteenth and early nineteenth centuries', *Trans. Historic Soc. of Lancs. and Cheshire*, 116 (1964).
Craig, R.S., 'Some aspects of the trade and shipping of the River Dee in the eighteenth century', *Trans. Hist. Soc. of Lancs. and Cheshire*, CXIV (1963).
Crawford, A., *Bristol and the wine trade (Bristol, 1984).*
Cross, D.A.E., 'The Salisbury Avon navigation', *J. of Industrial Archaeol.*, 7 (1970), pp. 121-30.
Cross, D.A.E., 'The salt industry of Lymington', *J. of Industrial Archaeol.*, 2 (1965), pp. 86-90.
Crouch, H., *A complete view of the British Customs; containing the rates of merchandise...to which is now added a supplement...to the end of the session of Parliament, anno undecimo Georgii* (1725).
Crouch, H., *A complete guide to the officers of His Majesty's Customs in the outports* (1732) (BM Printed books 522, n.8).
Crump, W.B., 'Saltways from the Cheshire wiches', *Trans. Lancs. and Cheshire Antiquarian Soc.*, 54 (1939), pp. 84-142.
Culpeper's complete herbal (n.d.).
Cutting, C.L., *Fish saving: a history of fish processing from ancient to modern times* (1955).
Darby, H.C., ed., *A new historical geography of England after 1600* (Cambridge, 1973).
Darby, H.C., ed., *A new historical geography of England before 1600* (Cambridge, 1976).
Davies, A.S., 'The river trade of Montgomeryshire and its borders', *Montgomeryshire Collections*, XLIII (1933), pp. 33-46.
Davies, A.S., 'The river trade of Montgomeryshire and its borders', *Montgomeryshire Collections*, (1934).
Davies, A.S., 'The river trade of Montgomeryshire and its borders', *Montgomeryshire Collections*, (1935).
Davies, D.J., *The economic history of south Wales prior to 1800* (Cardiff, 1933).
Davies, S.W., 'An economic history of Bewdley before c.1700', unpublished PhD thesis, University of London (1981).
Davies, T.J., 'The Severn', *Montgomeryshire Collections*, XXX (1898), pp. 177-202.
Davis, R., *English overseas trade 1500-1700* (1973).
Davis, R., *The rise of the English shipping industry in the seventeenth and eighteenth centuries* (1962).
Davis, R., *The trade and shipping of Hull, 1500-1700* (1964).
Davis, R., 'English foreign trade, 1700-74', *Econ. Hist. Rev.*, 2nd ser. XV (1962), pp. 285-303, reprinted in Minchinton, W.E., *The growth of English overseas trade in the seventeenth and eighteenth centuries* (1969), pp. 99-119.
Davis, R., 'English foreign trade, 1660-1700', *Econ. Hist. Rev.*, 2nd ser. VII (1954), pp. 150-66, reprinted in Minchinton, W.E., *The growth of English overseas trade in the seventeenth and eighteenth centuries* (1969), pp. 78-98.
Day, J., *Bristol brass: the history of the industry* (Newton Abbot, 1973).

Day, J., 'The Costers: copper smelters and manufacturers', *Trans. Newcomen Soc.*, 47 (1974-6), pp. 48-58.
Deane, P., *The first industrial nation* (2nd ed, 1979).
Deane, P., and Cole, W.A., *British economic growth 1688-1959, trends and structure*, 2nd edn. (Cambridge, 1969).
Defoe, D., *A tour through the whole island of Great Britain* (1724-6, reprinted 1974).
Defoe, D., *The complete English tradesman* (1727, reprinted, Gloucester, 1987).
Defoe, D., *The storm: or, a collection of the most remarkable casualties and disasters which happened in the late dreadful tempest both by sea and land* (1704).
Denley, P., and Hopkin, D., *History and computing* (Manchester, 1987).
Denley, P., Fogelvik, S. and Harvey, C., *History and computing II* (Manchester, 1989).
Denton, J.H., and Lewis, M.J.T., 'The river Tern navigation', *J. of the Railway and Canal Hist. Soc.*, XXIII (1977).
De Salis, H.R., *Bradshaw's canals and navigable rivers of England and Wales* (1918).
De Vries, J., *The economy of Europe in an age of crisis, 1600-1750* (Cambridge, 1976).
Dicken, E.P., 'Notes on the coast, shipping and seaborne trade of Essex from 1565 to 1577', *Trans. Essex Archaeol. Soc.*, XVII (1924), pp. 153-64.
Dickinson, G.C., *Statistical mapping and the presentation of statistics* (1963, 2nd edn. 1973).
Dickson, P.G.M., *The financial revolution in England: a study in the development of public credit, 1688-1756* (1967).
Dodd, A.H., *The industrial revolution in north Wales* (1951).
Dodd, G., *Days at the factories* (1843, reprinted New York, 1967).
Dodgshon, R.A., and Butlin, R.A., eds., *An historical geography of England and Wales* (1978).Douglas, M. and Isherwood, B., *The world of goods; towards an anthropology of consumption* (Harmondsworth 1978; pbk edn. 1980).
Duckham, B.F., *Navigable rivers of Yorkshire: their history and traditions* (Clapham, Yorkshire, 1964).
Duckham, B.F., *The inland waterways of East Yorkshire, 1700-1900* (Hull, 1973).
Duckham, B.F., *The Yorkshire Ouse: the history of a river navigation* (Newton Abbot, 1967).
Duckham, B.F., 'Selby and the Aire and Calder navigation, 1774-1826', *J. of Transport Hist.*, VII (1965).
Duckham, B.F., 'The Fitzwilliams and the navigation of the Yorkshire Derwent', *Northern Hist.*, II (1967).
Duckham, B.F., 'Canals and river navigations', in Aldcroft, D., and Freeman, M.J., eds., *Transport in the industrial revolution* (Manchester, 1983), pp. 100-141.
Dyde, W., *The history and antiquities of Tewkesbury* (1798).
Dyer, A., *The city of Worcester in the sixteenth century* (Leicester, 1973).
Dyer, C., 'The consumer and the market in the late middle ages', *Econ. Hist. Rev.*, 2nd ser. XLII (1989), pp. 305-27.
Dyos, H.J., and Aldcroft, D.H., *British transport: an economic survey from the seventeenth century to the twentieth* (Leicester, 1969, reprinted, Harmondsworth, 1974).
Eaglesham, N., *Whitehaven and the tobacco trade* (Whitehaven, 1979).
East, W.G., 'The Severn waterway in the eighteenth and nineteenth centuries', in Stamp, L.D. and Wooldridge, S.W., eds., *London essays in Geography* (1951), pp. 91-110.
Edgar, W., *Vectigalium Systemata: or a complete view of that part of the revenue of Great Britain commonly called Customs* (1714, 2nd edn., 1718).
Edwards, G., 'The coal industry in Pembrokeshire', *Field Studies*, 1, 5 (1963), 33-64.
Eglinton, E., *The last of the sailing coasters: reminiscences and observations of the days in the Severn trows, coasting ketches and schooners* (1982).
Ellis, J., 'The decline and fall of the Tyneside salt industry, 1660-1790: a re-examination', *Econ. Hist. Rev.*, 2nd ser. XXXIII (1980), pp. 45-58.
Emmison, F.G., *Archives and local history* (1966).
Evans, M., 'The seaborne trade of the port of Ipswich and its members', unpublished Ph.D. thesis, University of East Anglia (1987).
Evans, M.C.S., 'Carmarthen and the Welsh Port Books, 1550-1603', *Carmarthenshire Antiquarian* (1960).
Everett, D.E.C., Laslett, P., and Wrigley, E.A., *An introduction to English historical demography, from the sixteenth to the nineteenth centuries* (1966).
Everitt, A., ed., *Change in the provinces: the seventeenth century* (1973).
Everitt, A.M., 'The marketing of agricultural produce', in Joan Thirsk, ed., *The Agrarian History of England and Wales, Volume IV* (1967).
Fairclough, K.R., 'The River Lee 1571-1767: a river navigation prior to canalisation', unpublished Ph.D. thesis, University of London (1986).
Fairclough, K.R., 'The River Lee before 1767: an adequate flash lock navigation', *J. of Transport Hist.* 3rd ser., 10 (1989), pp. 128-44.
Fairholt, F.W., *Tobacco: its history and associations* (1859).
Farr, G., 'Severn navigation and the trow', *Mariner's Mirror*, XXVI, 3 (1940), pp. 66-101.
Farr, G.E., 'Severn navigation and the trow', *Mariner's Mirror*, XXXII (1946), pp. 66-95.
Farr, G.E., *Chepstow Ships* (1954).
Farr, G., 'Severn trows - today and yesterday', *Gloucestershire Countryside*, April 1960, pp. 24-5.
Farrant, J.H., *The harbours of Sussex, 1700-1914* (Brighton, n.d., c. 1970).
Farrant, J.H., 'The seaborne trade of Sussex, 1720-1845', *Sussex Archaeological Collections* 114 (1976), pp. 97-120.
Fischer, L.R. and Sager, E.W., 'An approach to the quantitative analysis of British shipping registers', *Business Hist.* 22 (1980), pp. 135-51.

Fisher, F.J., 'The development of the London food market, 1540-1640', *Econ. Hist. Rev.*, II (1935), pp. 46-64.
Fisher, F.J., 'The development of London as a centre of conspicuous consumption in the sixteenth and seventeenth centuries', *Trans. Royal Hist. Soc.*, 4th series, XXX (1948).
Fisher, H.E.S., 'The south-west and the Atlantic trades, 1660-1760' in Fisher, H.E.S., ed., 'The south-west and the sea' *Exeter Papers in Econ. Hist.*, 1 (1968), pp.7-14.
Fisher, R.N., and Pagett, C.M., *Essays towards a history of Bewdley* (Bewdley, 1972).
Fisher, R.N., and Pagett, C.M., 'A brief history of transportation and communication in Bewdley', in Snell, L.S., ed., *Essays towards a history of Bewdley* (Bewdley, 1972), pp. 60-81.
Flinn, M.W., *Men of iron: the Crowleys in the early iron industry* (Edinburgh, 1962).
Flinn, M.W., *The history of the British coal industry, volume 2, 1700-1830: the industrial revolution* (Oxford, 1984).
Flinn, M.W., *The origins of the industrial revolution* (1966).
Flinn, M.W., *British population growth, 1700-1850* (1970).
Floud, R., *An introduction to quantitative methods for historians* (1973).
Floud, R., and McLosky, D., eds., *The economic history of Britain since 1700, volume 1: 1700-1800* (1981).
Forbes, U.A., and Ashford, W.H.R., *Our waterways: a history of inland navigation considered as a branch of water conservancy* (1906).
Forrest, H.E., ed., *Shrewsbury burgess roll* (1924).
Fosbrooke, T.D., *An original history of the City of Gloucester...'* (1819, reprinted, Gloucester, 1986).
Fowler, G.H., 'Fenland waterways past and present', *Proceedings and Communications of the Cambridge Antiquarian Soc.*, 33 (1933), pp. 108-28, and 34 (1934), pp. 117-33.
Freeman, M., 'The industial revolution and the regional geography of England: a comment', *Trans. Inst. British Geographers*, new ser. 9 (1984), pp. 507-12.
Freeman, M.J., 'Introduction', in Aldcroft, D., and Freeman, M.J., eds., *Transport in the industrial revolution* (Manchester, 1983), pp. 1-30.
Freeman, M.J., 'A perspective on the geography of English internal trade during the industrial revolution', *School of Geography, University of Oxford, Research Papers*, 29 (1982).
Freeman, M.J., 'Road transport in the English industrial revolution: an interim reassessment', *J. of Hist. Geog.*, 6, 1 (1980), pp. 17-28.
Freeman, M.J., 'Transporting methods in the British cotton industry during the industrial revolution', *J. Transport Hist.*, 3rd ser. I (1980), pp. 59-74.
Freeman, M.J., 'Transport', in Langton, J., and Morris, R.J., *Atlas of industrialising Britain 1780-1914* (1986), pp. 80-93.
Friis, A., *Alderman Cockayne's project and the cloth trade* (1927).
Fussell, G.E., and Goodman, C., 'The eighteenth-century traffic in milk products', *Econ. Hist.*, III (1934-7), pp. 380-7.
F[anshawe], Sir T., *Practice of the Exchequer* (1658).
Galbraith, V.H., *Studies in the Public Records* (1948).
Gaut, R.C., *A history of Worcestershire agriculture and rural evolution* (Worcester, 1939).
George, B.J., 'Pembrokeshire sea-Trading before 1900', *Field Studies*, 2, 1 (1964). pp.1-39.
Gerhold, D., 'The growth of the London carrying trade, 1681-1838', *Econ. Hist. Rev.*, 2nd ser. XLI (1988), pp. 392-410.
Glass, D.V. and Eversley, D.E.C., eds., *Population in history* (1965).
Goodfellow, A.W., 'Sheffield's waterway to the sea', *Trans. Hunter Archaeol. Soc.*, V (1943).
Goose, N.R., 'In search of the urban variable: towns and the English economy, 1500-1650', *Econ. Hist. Rev.* 2nd ser. XXXIX (1986), pp.165-185.
Gough, J.W., *The rise of the entrepreneur* (1969).
Grant, A. and Jemmett, D., 'Pipes and pipe-making in Barnstaple, Devon', in Peter Davey (ed). 'The archaeology of the clay tobacco pipe IX', *British Archaeological Reports*, British Series, 146, ii (1985), pp. 439-553.
Gras, N.S.B., *The early English Customs system* (1918).
Gras, N.S.B., *The evolution of the English corn market, from the twelfth to the eighteenth century* (1915).
Gras, N.S.B., 'Memorandum on the Port Books', *First Report of the Royal Commission on the Public Records*, Appendix IV (16). Parliamentary Papers 1912-13, XLIV (1913), pp.125-7.
Gras, N.S.B., *Industrial evolution* (1930, reprinted New York, 1969).
Gray, I., 'The Severn bore: an eighteenth-century description', *Trans. Bristol and Glos. Archaeol. Soc.*, XCVII (1979), pp. 123-6.
Greenhill, B., 'The story of the Severn trow', *Mariner's Mirror*, XXVI (1940), pp. 286-92.
Grimuard, J., 'Les Ports Books anglais, sources d'histoire commerciale', *Canadian J. Hist.*, 18 (1983), 349-77.
Guelke, L., 'On rethinking historical geography', *Area*, 7 (1975), pp. 135-8.
Hadfield, C., and Skempton, A.W., *William Jessop, engineer* (Newton Abbot, 1979).
Hadfield, C., *British canals: an illustrated history* (Newton Abbot, 1950, 5th. edn. 1974).
Hadfield, C., *The canals of south and south-east England* (Newton Abbot, 1969).
Hadfield, C., *The canals of south Wales and the Border* (1960, 2nd edn. Newton Abbot, 1967).
Hadfield, C., *The canals of southern England* (1955).
Hadfield, C., *The canals of south-west England* (Newton Abbot, 1967).
Hadfield, C., *The canals of the west midlands* (Newton Abbot, 1966).
Hadfield, C., *World canals: inland navigation past and present* (Newton Abbot, 1986).
Hadfield, C. and Norris, J., *Waterways to Stratford* (Newton Abbot, 1962, 2nd edn., 1968).
Hall, H., and Nicholas, F.J., eds., 'Select tracts and table books relating to English weigths and measures', *Camden Miscellany*, XV

(1929).
Hall, H., *History of the Customs Revenue in England*, 2 vols., (1885).
Hamilton, H., *The English brass and copper industries to 1800* (1926, 2nd ed. 1967).
Hammersley, G., 'The charcoal iron industry and its fuel, 1540-1750', *Econ. Hist. Rev.*, 2nd ser. XXVI (1973), pp. 593-613.
Handford, M., *The Stroudwater Canal, volume 1: 1729-1763* (Bradford-on-Avon, 1976).
Harral, T., *Picturesque views of the River Severn with historical and topographical illustrations by Thomas Harral*, 2 vols., (1824).
Hart, C., *The industrial history of Dean, with an introduction to its industrial archaeology* (Newton Abbot, 1971).
Hartwell, R.M., ed., *The causes of the industrial revolution in England* (1967).
Hartwell, R.M., 'Economic growth in England before the industrial revolution: some methodological issues', *J. of Econ. Hist.*, 29 (1969), pp. 13-31.
Hassall, C., *A general view of the agriculture of the county of Pembroke*, (1794).
Hausman, W.J., 'The English coastal coal trade, 1691-1910: how rapid was productivity growth?', *Econ. Hist. Rev.*, 2nd ser. XL (1987), pp. 588-96.
Hawke, G.R., *Railways and economic growth in England and Wales* (Oxford, 1970).
Hazzard, A.C., 'Lydney and the Severn trows', *Sea Breezes*, March 1971, pp. 179-81.
Henderson, C.G., 'Exeter Quay and the Exeter Canal in the sixteenth and seventeenth centuries', *Maritime South West*, 4 (1988), pp. 4-17.
Herbert, N., ed., *Road travel and transport in Gloucestershire 1722-1822* (gloucester, 1985).
Herbert, N.M., 'The Newnham and London traders', *Trans. Bristol and Glos. Archaeol. Soc.*, XCVII (1979), pp. 93-100.
Hey, D., *Packmen, carriers and packhorse roads: trade and communications in North Derbyshire and South Yorkshire* (Leicester, 1980).
Hey, D.G., 'A dual economy in south Yorkshire', *Ag. Hist. Rev.*, XVII (1969), pp. 108-19.
Hey, D., ed., *The History of Myddle* by Richard Gough (Harmondsworth, 1981).
Hey, D., 'The north west midlands', in Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, I Regional farming systems* (Cambridge, 1985), pp. 129-58.
Higgins, D.H., 'The interpretation and regional study of clay tobacco pipes: a case study of the Broseley district', unpublished Ph.D. thesis, University of Liverpool (1987).
Hill, C., *Reformation to industrial revolution: a social and economic history of Britain 1530-1780* (1967, revised edition, Harmondsworth, 1969).
Hinton, R.W.K., *The Eastland trade and the common weal in the seventeenth century* (Cambridge, 1959).
Hinton, R.W.K. ed., 'The Port Books of Boston, 1600-1640', *Lincoln Rec. Soc.* 50 (1956).
Holderness, B.A., *Pre-industrial England: economy and society 1500-1750* (1976).
Holland, D., *Bawtry and the Idle river trade* (1976).
Hoon, E.E., *The organisation of the English Customs system, 1696-1786* (1938, reprinted, Newton Abbot, 1968).
Hopkinson, G.G., 'The development of inland navigation in south Yorkshire and north Debyshire 1697-1850', *Trans. Hunter Archaeol. Soc.*, VII (1956), pp. 229-51.
Hoskins, W.G., *Fieldwork in local history* (2nd edn. 1982).
Hoskins, W.G., *Industry, trade and people in Exeter, 1688-1800* (Manchester 1935, 2nd edn. Exeter, 1968).
Hoskins, W.G., *Local history in England* (1959, 3rd edn. 1984).
Hoskins, W.G., 'Harvest fluctuations and English economic history 1620-1759 , *Ag. Hist. Rev.*, XVI (1968), pp. 15-31.
Hoskins, W.G., 'Harvest fluctuations in English economic history 1480-1619', *Ag. Hist. Rev.*, XII (1964), pp. 28-46.
Houghton, J., *A collection for the improvement of husbandry and trade*, 4 vols., (1727-8).
Household, H., *The Thames and Severn Canal* (Newton Abbot, 1969, 2nd edn. Gloucester, 1983).
Hudson, P., ed., *Regions and industries: a persective on the Industrial Revolution in Britain* (Cambridge, 1989).
Hughes, E., *Studies in administration and finance 1558-1825, with special reference to the history of salt taxation in England* (Manchester, 1934, reprinted Philadelphia, 1980).
Hughes, S.R., *The archaeology of the Montgomery Canal* (5th edn. Aberystwyth, 1988).
Hurle, P., *Upton: portrait of a Severnside town* (Chichester, 1979).
Hyde, C.K., *Technological change and the British iron industry, 1700-1870* (Princeton, 1977).
Index Vectigalium; or an abbreviated collection of the laws, edicts, rules and practices, touching the customs, or subsidies of tunnage and poundage etc. (1670).
Innis, H.A., *The cod fisheries: the history of an international economy* (New Haven and Toronto, 1940).
Jack, S.M., *Trade and industry in Tudor and Stuart England* (1977).
Jackman, W.T., *The development of transportation in modern England*, 2 vols., (1916, 3rd edn. 1966).
Jackson, G., *Hull in the eighteenth century: a study in economic and social history* (1972).
Jackson, G., *The trade and shipping of eighteenth-century Hull* (York, 1975).
Jackson, G., 'The ports', in Derek H. Aldcroft and Michael J. Freeman, *Transport in the industrial revolution* (1983).
Jackson, R.G., and Price, R.H., 'Bristol clay pipes: a study of makers and their marks', *Bristol City Museum Research Monographs*, 1 (Bristol, 1974).
Jackson, R.V., 'Growth and deceleration in English agriculture, 1660-1790', *Econ. Hist. Rev.*, 2nd ser. 38 (1985).
Jarvis, R.C., 'Sources for the history of ports', *J. of Transport History* 3 (1957-8), pp. 76-93.
Jarvis, R.C., 'Sources for the history of ships and shipping', *J. of Transport History*, 3 (1958).
Jarvis, R.C., 'The appointment of ports', *Econ. Hist. Rev.*, 2nd ser. XI (1958).

Jarvis, R.C., 'The head port of Chester; and Liverpool, its creek and member' *Trans. Hist. Soc. of Lancs and Cheshire*, CII (1950), pp.69-84.
Jenkins, D., 'A late seventeenth-century shopkeeper: the will and inventory of Cadwalader Jones', *Montgomeryshire Collections*, 69 (1981), pp. 45-56.
Jenkins, H.J.K., 'A mid-seventeenth century scheme for navigation on the River Nene', *Northamptonshire Past and Present*, 8 (1989), pp. 25-30.
Jenkins, R., 'The copper works at Redbrook and Bristol', *Trans. Bristol. and Glos. Archaeol. Soc.*, LXIII (1942), pp. 145-67.
Jenkins, T.J., *The herring and the herring fisheries*, (1924).
Jessop, W., *Report on the present navigable state of the River Severn, and on the means of improving the navigation from a survey taken in May, 1784* (1784).
John, A.H., *The industrial development of south Wales, 1750-1850: an essay* (Cardiff, 1950).
John, A.H., 'English agricultural improvement and grain exports, 1660-1765', in Coleman, D.C., and John, A.H., *Trade, government and economy in pre-industrial England: essays presented to F.J. Fisher* (1976), pp. 45-67.
John, A.H., 'War and the English Economy 1700-1763', *Econ. Hist. Rev.*, 2nd ser. VII (1954-5), pp. 329.
Johnson, B.L.C., 'The charcoal iron industry in the early eighteenth century', *Geog. J.*, 117 (1951), pp. 167-77.
Johnson, B.L.C., 'The Foley partnerships: the iron industry at the end of the charcoal era', *Econ. Hist. Rev.*, 2nd ser. IV (1952), pp. 322-40.
Johnson, B.L.C., 'The Stour valley iron industry in the late seventeenth century', *Trans. Worcestershire Archaeol. Soc.*, new ser. 27 (1950), pp. 35-46.
Jones, A., *Tewkesbury* (Chichester, 1987).
Jones, E.L., ed., *Agriculture and economic growth in England, 1650-1815* (1967).
Jones, H.E., 'The Lea Valley, 1750-1900: a regional study of transport and industrial development', unpublished Ph.D. thesis, University of Oxford (1982).
Kain, R.J.P. and Prince, H.C., *The tithe surveys of England and Wales* (Cambridge, 1985).
Kenyon, R.L., ed., *Abstract of orders made by the court of Quarter Sessions for Shropshire, January 1660-April 1694* (Shrewsbury, 1908).
Kerridge, E., *Textile manufactures in early modern England* (Manchester, 1985).
Kerridge, E., *The agricultural revolution* (1967).
King, P.W., 'Wolverley Lower Mill and the beginnings of the tinplate industry', *Historical Metallurgy*, 22 (1988), pp. 104-13.
Lamb, D.F., 'The seaborne trade of Southampton in the first half of the seventeenth century', unpublished M.Phil. thesis, University of Southampton (1972).
Lamb, H.H., *Climate, history and the modern world* (1982).
Lamb, H.H., *The changing climate: selected papers* (1966).
Langton, J., and Morris, R.J., *Atlas of industrialising Britain 1780-1914* (1986).
Langton, J., *Geographical change and industrial revolution: coalmining in south west Lancashire 1590-1799* (Cambridge, 1979)
Langton, J., 'The industrial revolution and the regional geography of England', *Trans. Inst. British Geographers*, new ser. 9 (1984), pp. 145-67.
Large, P., 'Urban growth and agricultural change in the West Midlands during the seventeenth and eighteenth centuries', in Clark, P., ed., *The transformation of English provincial towns 1600-1800* (1984), pp. 169-89.
Latimer, J., *The annals of Bristol in the eighteenth century* (Bristol, 1893).
Latimer, J., *The annals of Bristol in the seventeenth century* (Bristol, 1900).
Leese, F.E., 'A calendar and analysis, with introduction, of two Elizabethan Port Books (E190/5/1 and E190/5/6)', unpublished B.Litt. thesis, University of Oxford (1950).
Levine, D., *Family formation in an age of nascent capitalism* (1977).
Lewis, E.A., ed., 'The Welsh Port Books, 1550-1603', *Cymmrodorion Rec. Series* No.12 (1927).
Lewis, E.A., 'The Port Books of Cardigan in Elizabethan and Stuart times', *Cardigan Antiquarian Soc.*, VII (1930), pp.21-49. VIII (1931), pp.36-62. XI (1936), pp.83-114.
Lewis, M.J.T., and Wright, N.R., *Boston as a port* (Boston, Lincs., 1973).
Lewis, M.J.T., *Early wooden railways* (1970).
Lewis, W.J., *Lead mining in Wales* (Cardiff, 1967).
Lindsay, J., *The Trent and Mersey Canal* (Newton Abbot, 1979).
Linnard, W., 'Floating boaters: moving timber on British rivers', *Country Quest*, November 1984, pp. 36-7.
Lipson, E., *The economic history of England*, 3 vols., (1931).
Lloyd, H., *The Quaker Lloyds in the industrial revolution* (1975).
Macfarlane, A., *Reconstructing historical communities* (Cambridge, 1977).
MacInnes, C.M., *Bristol: a gateway of empire* (Bristol, 1939, reprinted, Newton Abbot, 1968).
MacInnes, C.M., *The early English tobacco trade* (1926).
MacMahon, K.A., 'Beverley and its beck: borough finance and a town navigation, 1700-1835', *Transport Hist.*, IV (1971).
Mann, J. de L., *The cloth industry in the West of England from 1640 to 1880* (Oxford, 1971, reprinted Gloucester, 1987).
Mantoux, P., *The industrial revolution in the eighteenth century* (1928, revised, 1961).
Marten, E.D., 'The Severn navigations, with particular reference to recent improvements', *Trans. Federated Inst. of Mining Engineers*, 8 (1894-5), pp. 499-510. (See also pp. 419-548).
Mathias, P., *The first industrial nation: an economic history of Britain 1700-1914* (1969, revised, 1983).
Mathias, P., *The transformation of England: essays in the economic and social history of England in the eighteenth century* (1979)

McGrath, P., ed., *Bristol in the eighteenth century* (Newton Abbot, 1972).
McGrath, P., ed., 'Merchants and merchandise in seventeenth century Bristol', *Bristol Rec. Soc.*, XIX (1955).
McGrath, P., *The Merchant Venturers of Bristol: a history of the Society of Merchant Venturers of the City of Bristol from its origins to the present day* (Bristol, 1975).
McGrath, P.V., 'The marketing of food, fodder and livestock in the London area in the seventeenth century', unpublished MA thesis, University of London (1948).
McKendrick, N., Brewer, J., and Plumb, J.H., *The birth of a consumer society: the commercialisation of eighteenth-century England* (1982).
Mendels, F.F., 'Proto-industrialization: the first phase of the industrialization process', *J. of Econ. Hist.*, 32 (1972), pp 241-61.
Mendenhall, T.C., *The Shrewsbury drapers and the Welsh wool trade in the sixteenth and seventeenth centuries* (Oxford, 1953).
Metters, G. A., 'The rulers and merchants of Kings Lynn in the early seventeenth century', Unpublished PhD thesis, University of East Anglia (1982).
Metz, R., Van Cauwenberghe, E. and van der Voort, R. (eds.), *Historical information systems: proceedings of the tenth international economic history congress, Leuven, August 1990* (Leuven, 1990).
Minchinton, W.E., *The growth of English overseas trade in the seventeenth and eighteenth centuries* (1969).
Minchinton, W.E., *The Port of Bristol in the eighteenth century* (Bristol, 1962).
Minchinton, W.E., 'Bristol: metropolis of the west in the eighteenth century', *Trans. Royal Hist. Soc.*, 5th ser. 4 (1954), pp. 69-89.
Minchinton, W.E., 'The trade of Bristol in the eighteenth century', *Bristol Rec. Soc.* XX (Bristol, 1957).
Minshull, T., *The Shrewsbury guide and Salopian directory for the year MDCCLXXVI* (Shrewsbury, 1786).
Mitchell, I., 'The development of urban retailing 1700-1815', in Clark, P., ed., *The transformation of English provincial towns 1600-1800* (1984), pp. 259-83.
Morgan, N. and Moss, M., 'Urban wealthholding and the computer', pp. 181-92 in Denley, P., Fogelvik, S. and Harvey, C., *History and computing II* (Manchester, 1989).
Morris, C., ed., *The illustrated journeys of Celia Fiennes c. 1682-c. 1712* (1984).
Muskett, P., 'Deal smugglers in the eighteenth century', *Southern History*, 8 (1986), pp. 46-72.
Nance, R.M., 'Trows, past and present', *Mariner's Mirror*, II, 7 (1912), pp. 201-5.
Nash, T.R., *Collections for the history of Worcestershire, volume 1* (1781).
Nef, J.U., *The rise of the British coal industry*, 2 vols., (1932, reprinted, 1966).
Nef, J.U., 'The progress of technology and the growth of large-scale industry in Great Britain, 1540-1640', *Econ. Hist. Rev.* 5 (1934).
Ogg, D., *England in the reigns of James II and William III* (1955).
Owen, A.E.B., 'Short guides to records 15: records of Commissioners of Sewers', *History*, LII (1967), pp. 35-8.
Owen, H., ed., 'The description of Pembrokeshire by George Owen, 1603' *Cymmrodorion Rec. Ser.* I (1892).
Owens, W.R., *Seventeenth-century England: a changing culture, volume 2: modern studies* (1980).
Owen, W., 'Narrative, travels, etc. of Captain William Owen, R.N.', *Montgomeryshire Collections*, 16 (1883), pp. 239-258.
O'Gorman, F., 'Electoral behaviour in England, 1700-1872', pp. 220-238 in Denley, P., Fogelvik, S. and Harvey, C., *History and computing II* (Manchester, 1989).
Outhwaite, R.B., *Inflation in Tudor and Stuart England* (1969).
Page, W., and Willis-Bund, J.W., *Victoria County History of the County of Worcester, volume III* (1913).
Paget-Tomlinson, E.W., *The complete book of canal and river navigations* (Albrighton, Shropshire, 1978).
Palmer, J.J.N., 'Computerising Domesday Book', *Trans. of the Institute of British Geographers* 11 No.3 (1986).
Palmer, J.N., and Berrill, M.I., 'Andrew Yarranton and the navigation works at Astley', *J. of the Railway and Canal Hist. Soc.*, 4, 5 (1958), pp. 41-6.
Palser, M.A.R., 'A Severnside merchant: Richard Wintle of Newnham', *Glos. Hist. Studies*, I (1967), pp. 22-5.
Pannett, D., 'Fish weirs on the River Severn', in Oxford University Department of External Studies, *The evolution of marshland landscapes* (Oxford, 1981).
Pannett, D.J., 'Fish weirs of the River Severn', *Folk Life*, 26 (1987-8), pp. 54-64.
Parker, J.F., 'The Severn barge trade', *Kidderminster Times*, 11 May, 1946.
Patten, J., *English towns 1500-1700* (Folkestone, 1978).
Pawson, E., *The early industrial revolution* (1979).
Pawson, E., *Transport and economy: the turnpike roads of eighteenth-century Britain* (1977).
Pee, R., 'The Severn in south Shropshire, part 1: geology of the course of the river', *J. of the Wilkinson Soc.*, 5 (1977), pp. 6-8.
Pee, R., 'The Severn in south Shropshire, part 2: navigation', *J. of the Wilkinson Soc.*, 6 (1978), pp. 4-8.
Peel, J.H.B., *Portrait of the Severn* (1968).
Penn, W.A., *The soveraine herb* (1901).
Perry, G., 'A description of the Severn', *Gentleman's Mag.*, XXVIII (1758), pp. 277-8.
Persson, K.G., *Pre-industrial economic growth* (Oxford, 1988).
Phelps-Brown, E.H., and Hopkins, S.V., 'Seven centuries of the prices of consumables compared with builders' wage rates', in Carus-Wilson, E.M., ed., *Essays in economic history*, volume 2, (1962), pp. 179-96.
Phillips, T., *The history and antiquities of Shrewsbury from its first foundation to the present time* (Shrewsbury, 1779).
Pidgeon, H., *Memorials of Shrewsbury: being a concise description of the town and its environs*, 2nd edn. (Shrewsbury, 1851).
Plot, R., *The natural history of Staffordshire* (1686).
Plumb, J.H., *England in the eighteenth century, 1714-1815* (Harmondsworth, 1950).
Plymley, J., *General view of the agriculture of Shropshire* (1803).

Pollard, S., *The genesis of modern management: a study in the industrial revolution in Great Britain* (1965, reprinted Harmondsworth, 1968).
Powell, A.C., 'Glass making in Bristol', *Trans. Bristol. and Glos. Archaeol. Soc.*, XLVII (1925), pp. 211-57.
Pressnell, L.S., *Country banking in the industrial revolution* (Oxford, 1956).
Prince, H.C., 'England c1800', in Darby, H.C., *A new historical geography of England after 1600* (Cambridge 1973), pp. 458-64.
Prior, M., *Fisher Row: fishermen, bargemen and canal boatmen in Oxford 1500-1900* (Oxford, 1982).
Quinn, D.B., and Ruddock, A.A., 'Port Books of Southampton', *Southampton Rec. Soc.*, 37-8 (1937-8).
Ramsden, G., 'Two notes on the history of the Aire and Calder navigation', *Thoresby Miscellany*, XII, 4 (1954).
Ramsey, G.D., *English overseas trade during the centuries of emergence* (1957).
Ramsey, G.D., 'The smuggler's trade: a neglected aspect of English commercial development', *Trans. Royal Hist. Soc.*, 5th. ser. II (1952), pp. 131-57.
Ramsey, P., *Tudor economic problems* (1968).
Randall, J., *History of Madeley* (Madeley, Shropshire, 1880, reprinted, Shrewsbury, 1975).
Randall, J., *The clay industries, including the fictile and ceramic arts on the banks of the Severn...'* (Madeley, Shropshire, 1877, reprinted, Shrewsbury, 1980).
Randall, J., *The Severn valley* (Madeley, Shropshire, 1862).
Rastell, D., 'An account of the salt waters of Droitwich', *Phil. Trans. of the Royal Soc.* (1678).
Rath, T., 'The Tewkesbury hosiery industry', *Textile Hist.*, VII (1977), pp. 140-153.
Redstone, V.B., 'Ipswich Port Books', *Trans. Suffolk Inst. of Archaeol.*, XIV (1912), pp. 238-42.
Rees, W., 'The port books for the port of Cardiff and its member ports, Swansea and Neath, 1606-10', *South Wales and Monmouthshire Rec. Soc.*, 3 (1954), pp. 69-91.
Rees, W., *Industry before the industrial revolution: incorporating a study of the Chartered Companies of the Society of Mines Royal and of Mineral and Battery Works*, 2 vols., (Cardiff, 1968).
Riden, P., *A gazetteer of charcoal-fired blast furnaces in Great Britain in use since 1660* (Cardiff, 1987).
Riden, P., 'An eighteenth-century proposal for the navigation of the Rother', *Derbyshire Archaeol. J.*, 104 (1984), pp. 68-70.
Riden, P., 'An English factor at Stockholm in the 1680s', *Scandinavian Econ. Hist. Rev.*, 35 (1987), pp. 191-207.
Riden, P., 'The output of the British iron industry before 1870', *Econ. Hist. Rev.*, 2nd ser. XXX (1977), pp. 442-59.
Ripley, P., 'The City of Gloucester, 1660-1740', unpublished M.Litt. thesis, University of Bristol (1977).
Ripley, P., 'The economy of Gloucester 1660-1740', *Trans. Bristol and Glos. Archaeol. Soc.*, XCVIII (1980), pp. 135-53.
Ripley, P., 'Trade and social structure of Gloucester, 1600-1700', *Trans. Bristol and Glos. Archaeol. Soc.*, XCIV (1976), pp. 117-23.
Rive, A., 'The consumption of English tobacco since 1600', *Econ. J. Supplement*, (January 1926).
Rive, A., 'A short history of tobacco smuggling', *Econ. Hist. Rev.*, I (1929), pp. 554-69.
Robert, G.B., 'Notes on glass making in Gloucestershire', *Notes on Glos. History* (n.d.), (in Glos. Rec. Office ROL C6).
Rogers, A., *Approaches to local history* (1977).
Rogers, J.E.T., *A history of agriculture and prices in England from 1259 to 1793* (Oxford, 1887).
Rolt, L.T.C., *Navigable waterways* (1969).
Rolt, L.T.C., *The inland waterways of England* (1950).
Rostow, W.W., *The stages of economic growth: a non-communist manifesto* (Cambridge, 1960).
Rowbotham, F.W., *The Severn Bore* (Dawlish, 1964).
Rowbotham, F.W., 'The River Severn at Gloucester, with particular reference to its Roman and medieval channels', *Glevensis*, 12, pp. 4-9.
Rowlands, M.B., *Masters and men in the West Midlands metalware trades before the industrial revolution* (Manchester, 1975).
Rowlands, M.B., *The west midlands from AD 1000* (1987).
Rudder, S., *A new history of Gloucestershire* (Cirencester, 1779, repr. Dursley, 1977).
Rudder, S., *History and antiquities of Gloucestershire* (Cirencester, 1781).
Rudge, T., *A general view of the agriculture of the county of Gloucester...* (1807).
Rudge, T., *The history and antiquities of Gloucester* (Gloucester, 1811).
Salop County Council, *A guide to the Shropshire records* (Shrewsbury, 1952).
Samuel, A.M., *The herring: its effect on the history of Britain* (1918).
Schafer, R.G., 'A selection from the records of Philip Foley's Stour Valley iron works 1668-74. Part 1, *Worcestershire Historical Soc.*, new ser., 9 (1978).
Schumpeter, E.B., *English overseas trade statistics, 1697-1808* (Oxford, 1960).
Schurer, K., 'Census Enumerators' Returns and the Computer', *The Local Historian* 16 No.6 (1985).
Sellman, R.R., *A student's atlas of modern history* (1952).
Sharman, F., 'William Sandys and the Warwickshire Avon', *West Midlands Studies*, 10 (1977), pp. 2-7.
Sharman, F.A., 'River improvement law in the early seventeenth century', *J. of Legal Hist.*, (1982), pp. 222-45.
Simpson, S., *History of Worcestershire* (1746).
Skempton, A.W., 'Canals and river navigations before 1750', in Singer, C., et. al., eds., *A history of technology, volume 3: from the renaissance to the industrial revolution, c. 1500-1750* (Oxford, 1957).
Skipp, V., *Crisis and development: an ecological study of the Forest of Arden 1570-1674* (Cambridge, 1978).
Smith, D.I., and Stopp, P., *The river basin: an introduction to the study of hydrology* (Cambridge, 1978).
Smith, R.M., 'Population and its geography in England 1500-1730', in Dodgshon, R.A., and Butlin, R.A., eds., *An historical geography of England and Wales* (1978).

Smith, W., *An historical introduction to the economic geography of Great Britain* (1968).
Snell, L.S., ed., *Essays towards a history of Bewdley* (Bewdley, n.d. (1972)).
Southall,H., and Oliver, E., 'Drawing maps with a computer... or without?', *Hist. Computing*, 2 (1990), pp. 146-54.
Spufford, M., *The great re-cloathing of rural England: petty chapmen and their wares in the seventeenth century* (Cambridge, 1984).
Stamper, J.M.B., 'The Shropshire salt industry', *Trans. Shropshire Archaeol. Soc.*, LXIV (1985), pp. 77-82.
Starkey, H.F., *Schooner port: two centuries of upper Mersey sail* (Ormskirk, 1983).
Stephens, W.B., *Seventeenth-century Exeter: a study of industrial and commercial development 1625-1688* (1958).
Stephens, W.B., *Sources for English local history* (1981).
Stephens, W.B., 'The cloth exports of the provincial ports, 1600-40', *Econ. Hist. Rev.*, 2nd ser. XXII (1969), pp. 228-48.
Stephens, W.B., 'The Exchequer Port Books as a source for the history of the English cloth trade', *Textile History* 1 (1969), pp. 206-13.
Stephens, W.B., 'The overseas trade of Chester in the early seventeenth century', *Trans. of the Historic Soc. of Lancashire and Cheshire* (1969).
Stephens, W.B., 'The trade of Plymouth and the Cornish ports in the early seventeenth century', *Trans. of the Devonshire Association* (1969).
Stephens, W.B., 'Trade trends at Bristol, 1600-1700', *Trans. Bristol and Glos. Archaeol. Soc.*, XCIII (1974), pp.156-61.
Stephens, W.B., 'Trade trends in Bristol, 1600-1700', *Trans. Bristol and Glos. Archaeol. Soc.*, 93 (1974), pp.156-61.
Stern, W.M., 'Fish marketing in London in the first half of the eighteenth century', in Coleman, D.C., and John, A.H., *Trade, government and economy in pre-industrial England: essays presented to F.J. Fisher* (1976), pp. 68-77.
Stern, W.M., 'Cheese shipped coastwise to London towards the middle of the eighteenth century', *Guildhall Miscellany*, 4 (1973), pp. 207-21.
Stevens, B.J., 'Navigation on the Wye', *Memorials of Monmouth*, 5 (1965).
Stevenson, W.H., *Calendar of the records of the Corporation of Gloucester* (Gloucester, 1893).
Stout, William, *Autobiography of William Stout of Lancaster, 1665-1752*, Ed. J.D. Marshall, (New York, Barnes & Noble, 1967).
Studer, P., ed., *The Port Books of Southampton* (1913).
Summers, D., *The Great Ouse: the history of a river navigation* (Newton Abbot, 1973).
Symons, M.V., *Coal mining in the Llanelli area, volume one: sixteenth century to 1829* (Llanelli, 1979).
Talbut, G., 'Worcester as an industrial and commercial centre 1660-1750', *Trans. Worcestershire Archaeol. Soc.*, 3rd ser. 10 (1986), pp. 91-102.
Tann, J., 'The Yorkshire Foss navigation', *Transport Hist.*, III (1970).
Taylor, P.J., *Quantitative methods in geography: an introduction to spatial analysis* (1977).
Thacker, F.S., *The Thames highway: general history* (1914, reprinted, Newton Abbot, 1968).
Thacker, F.S., *The Thames highway: locks and weirs* (1920, reprinted, Newton Abbot, 1968).
Thaller, M., 'The need for a theory of historical computing', in Denley, P., Fogelvick, S., and Harvey, C., *History and computing II* (Manchester, 1989), pp. 2-11.
Thirsk, J., *Agricultural regions and agrarian history in England, 1500-1750* (Cambridge, 1987).
Thirsk, J., and Cooper, J.P., *Seventeenth-century economic documents* (Oxford, 1972).
Thirsk, J., *Economic policy and projects: the development of a consumer society in early modern England* (Oxford, 1978).
Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, I regional farming systems* (Cambridge, 1985).
Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, II agrarian change* (Cambridge, 1985).
Thirsk, J., *The agrarian history of England and Wales, volume IV* (Cambridge, 1967).
Thirsk, J., *The rural economy of England: collected essays* (1984).
Thirsk, J., 'Agricultural innovations and their diffusion', in Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, II Agrarian change* (Cambridge, 1985), pp. 533-89.
Thirsk, J., 'The south west midlands', in Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, I Regional farming systems* (Cambridge, 1985), pp. 159-98.
Thirsk, J., 'Industries in the countryside', in F.J. Fisher, ed., *Essays in the Economic History of Tudor and Stuart England in Honour of R.H. Tawney* (Cambridge, 1961), pp. 70-88, reprinted in Thirsk, J., *The rural economy of England: collected essays* (1984), pp. 217-34.
Thirsk, J., 'New crops and their diffusion: tobacco-growing in seventeenth-century England', in Thirsk, J., *The rural economy of England: collected essays*, pp. 259-85.
Thomas, J.H., *The seaborne trade of Portsmouth, 1650-1800* (Portsmouth, 1984).
Thompson, A., *The dynamics of the industrial revolution* (1973).
Tittler, R., 'The vitality of an Elizabethan port: the economy of Poole, c. 1500-1600', *Southern History*, 7 (1985), pp. 95-118.
Trinder, B., *The industrial revolution in Shropshire* (1973, 2nd edn. 1981).
Trinder, B., 'La vie d'une region en cours d'industrialisation: le Bassin houiller du Shropshire 1660-1790', in *L'Etude et la Mise en Valeur du Patrimoine Industriel, 1981* (Lyon-Grenoble, 1985).
Trinder, B., 'The Severn navigation at Dowles', *Trans. Shropshire Archaeol. Soc.*, LXIV (1985), pp. 29-33.
Trinder, B., 'The upper Severn navigation', *Glos. Rural Community Council Local Hist. Bull.*, 51 (1985), pp. 2-5.
Trinder, B. and Cox, J., *Yeomen and Colliers in Telford: the probate inventories of Dawley, Lilleshall, Wellington and Wrockwardine 1660-1750* (1980).
Turnbull, G., 'Canals, coal and regional growth during the industrial revolution', *Econ. Hist. Rev.*, 2nd ser. XL (1987), pp. 537-60.
Turnbull, G.L., *Traffic and transport: an economic history of Pickford's* (1979).

Turnbull, G.L., 'Provincial road carrying in England in the eighteenth century', *J. Transport Hist.*, 2nd ser. (IV (1977), pp. 17-39.
Twemlow, J.A., 'The etymology of bay salt', *Econ. Hist. Rev.*, XXXVI (1921), pp. 214-18.
Unwin, R.W., 'The Aire and Calder navigation: I, the beginning of the navigation', *Bradford Antiquary*, November 1964.
Unwin, R.W., 'The Aire and Calder navigation: II, the navigation in the pre-canal age', *Bradford Antiquary*, September 1967.
Van der Wee, H. and Aerts, E. (eds.), *Debates and controversies in economic history: proceedings of the tenth international economic history congress, Leuven, August 1990* (Leuven, 1990).
Vanes, J., *The Port of Bristol in the sixteenth century* (Bristol, 1977).
Vanes, J., 'Documents illustrating the overseas trade of Bristol in the sixteenth century', *Bristol Rec. Soc.* XXXI (Bristol, 1979).
Ville, S., 'Defending productivity growth in the English coal trade during the eighteenth and nineteenth centuries', *Econ. Hist. Rev.*, 2nd ser. XL (1987), pp. 597-602.
Ville, S., 'The problem of tonnage measurement in the English shipping industry, 1780-1830', *International J. of Maritime Hist.*, I, 2 (1989), pp. 65-84.
Ville, S., 'Total factor productivity in the English shipping industry: the north-east coal trade, 1700-1850', *Econ. Hist. Rev.*, 2nd ser. XXXIX (1986), pp. 355-70.
Wakelin, P., and Day, J., 'Joseph Harris in Bristol, 1748', *J. Bristol Industrial Archaeol. Soc.*, 15 (1982), pp. 8-12.
Wakelin, P., 'Comprehensive computerisation of a very large documentary source: the Portbooks Project at Wolverhampton Polytechnic', in Denley, P., and Hopkin, D., *History and computing* (Manchester, 1987), pp. 109-15.
Wakelin, P., 'Trade on the River Tone 1716-1832', in Langton, J. and Williams, M., eds., *Report of fieldwork carried out in Somerset County Record Office, Taunton, in March of 1982 by undergraduates of the School of Geography, University of Oxford* (1982).
Wanklyn, M.D.G., 'Industrial development in the Ironbridge Gorge before Abraham Darby', *West Midlands Studies*, XV (1982), pp. 3-7.
Wanklyn, M.D.G., 'John Weld of Willey 1585-1665: an enterprising landowner of the early seventeenth century', *West Midlands Studies*, 3 (1969), pp. 88-99.
Wanklyn, M.D.G., 'The Severn navigation in the seventeenth century: long-distance trade of Shrewsbury boats', *Midland History*, XIII (1988), pp. 34-58.
Wanklyn, M.D.G., 'Working paper on the definitions of terms used in the Bristol and Gloucester Port Books 1600-1720', unpublished paper of the Portbooks Programme, Wolverhampton Polytechnic (1986).
Waters, I., *The port of Chepstow* (Chepstow, 1989).
Watkins-Pitchford, W., *Bygone traffic on the River Severn, with special reference to the port of Bridgnorth* (Bridgnorth, 1935).
Weatherill, L., *Consumer behaviour and material culture, 1660-1760* (1988).
Weatherill, L., *The pottery trade and north Staffordshire 1660-1760* (Manchester, 1971).
Weatherill, L.M., 'The growth of the pottery industry in England, 1660-1815: some new evidence and estimates', *Post-Medieval Archaeology*, 17 (1983).
Westerfield, R.B., *Middlemen in English business: particularly between 1660 and 1760* (1915, reprinted, New York, 1968).
Whetter, J.C.A., 'The rise of the Port of Falmouth, 1600-1800' in Fisher, H.E.S., ed., 'Ports and shipping in the south-west', *Exeter Papers in Econ. Hist.*, 4 (1970), pp.1-32.
Wiggs, J.L., 'The seaborne trade of Southampton in the second half of the sixteenth century', unpublished MA thesis, University of Southampton (1955).
Willan, T.S., *An eighteenth-century shopkeeper: Abraham Dent of Kirkby Stephen* (Manchester, 1970).
Willan, T.S., ed., *A Tudor Book of Rates* (Manchester, 1962).
Willan, T.S., ed., 'Navigation of the Great Ouse between St. Ives and Bedford in the seventeenth century', *Bedfordshire Hist. Soc.*, XXIV (1946).
Willan, T.S., *River navigation in England 1600-1750* (Manchester, 1936, reprinted, 1964).
Willan, T.S., *The early history of the Don navigation* (Manchester, 1965).
Willan, T.S., *The English coasting trade 1600-1750* (Manchester, 1938, reprinted 1967).
Willan, T.S., *The inland trade: studies in English internal trade in the sixteenth and seventeenth centuries* (Manchester, 1976).
Willan, T.S., 'Bath and the navigation of the Avon', *Somerset Archaeol. and Natural Hist. Soc., Proc. of the Bath and District Branch*, (1936), pp. 139-40.
Willan, T.S., 'Chester and the navigation of the Dee, 1600-1750', *J. of the Chester and North Wales Architect., Archaeol. and Hist. Soc.*, XXXII, 1 (1938), pp. 64-7.
Willan, T.S., 'River navigation and trade from the Witham to the Yare, 1600-1750', *Trans. Norfolk and Norwich Archaeol. Soc.*, 26 (1936), pp. 296-309.
Willan, T.S., 'Salisbury and the navigation of the Avon', *Wiltshire Archaeol. and Natural Hist. Mag.*, XLVII (1937), pp. 592-4.
Willan, T.S., 'The navigation of the river Weaver in the eighteenth century', *Chetham Soc. Publications*, 3rd ser. 3 (1951).
Willan, T.S., 'The navigation of the Thames and Kennet, 1600-1750', *Berkshire Archeol. J.*, XL (1936), pp.146-56.
Willan, T.S., 'The river navigation and trade of the Severn valley, 1600-1750', *Econ. Hist. Rev.*, VIII (1937), pp. 68-79.
Willan, T.S., 'Yorkshire river navigation, 1600-1750', *Geography*, XXII (1937), pp. 189-99.
Williams, D.T., 'The Port Books of Swansea and Neath, 1709-19', *Archaeologia Cambrensis*, XCV (1940), pp.192-209.
Williams, L.A., *Road transport in Cumbria in the nineteenth century* (1975).
Williams, N., *Contraband cargoes: seven centuries of smuggling* (1959).
Williams, N., 'The London port books', *Trans. of the London and Middlesex Archaeological Soc.* 18 (1955), pp. 13-26.
Williams, N.J., *Descriptive list of Exchequer, Queen's Remembrancer, Port Books, Part 1: 1565-1700* (1960).
Williams, N.J., *The maritime trade of the East Anglian ports, 1550-1590* (Oxford, 1988).

Williams, N.J., 'Francis Shaxton and the Elizabethan Port Books', *English Historical Review* 66 (1951).
Williams, N.J., 'The maritime trade of the East Anglian ports, c1550-90', unpubished D.Phil. thesis, University of Oxford (1952).
Williams, T.D., 'The Port Books of Swansea and Neath, 1709-19', *Archaeologia Cambrensis*, XCV (1940), pp. 192-209.
Willis-Bund, J.W., and Page, W., *Victoria County History of the County of Worcester, volume II* (1906).
Wilson, C., *England's apprenticeship 1603-1763* (1965).
Wilson, C., 'Economics and politics in the seventeenth century', *Hist. J.*, V (1962), pp. 80-92.
Wilson, C.H., 'Land carriage in the seventeenth century', *Econ. Hist. Rev.*, 2nd ser. XXXIII (1980), pp. 92-5.
Wilson, R.G., 'The Aire and Calder navigation: III, the navigation in the second half of the eighteenth century', *Bradford Antiquary*, July 1969.
Wilson, R.G., 'Transport dues as indices of economic growth, 1775-1820', *Econ. Hist. Rev.*, XIX (1966), pp. 110-23.
Wood, A.C., 'The history of trade and transport on the River Trent', *Trans. Thoroton Soc.*, LIV (1950), pp. 1-44.
Woodward, D.M., *The trade of Elizabethan Chester* (Hull, 1970).
Woodward, D.M., 'Short guides to records 22: Port Books', *History*, 55 (1970), pp. 207-10.
Woodward, D.M., 'The Port-Books of England and Wales', *Maritime Hist.*, III (1973), pp.147-65.
Woodward, D.M., '"Swords into ploughshares": recycling in pre-industrial England, *Econ. Hist. Rev.* 2nd Series, 38 (1985).
Woodward, H.W., 'The glass industry of the Stourbridge district', *West Midlands Studies*, 8 (1976), pp. 36-42.
Wordie, J.R., 'The south', in Thirsk, J., ed., *The agrarian history of England and Wales, volume V, 1640-1750, I regional farming systems* (Cambridge, 1985), pp. 317-57.
Wrightson, K., *English society 1580-1680* (1982).
Wrigley, E.A., *Continuity, chance and change: the character of the industrial revolution in England* (Cambridge, 1988).
Wrigley, E.A., ed., *Identifying people in the past* (1973).
Wrigley, E.A., 'A simple model of London's importance in changing English society and economy, 1650-1750', *Past and Present* 37 (1967), pp. 44-60.
Wrigley, E.A., 'The supply of raw materials in the industrial revolution', *Econ. Hist. Rev.*, 2nd ser. XV (1962), pp. 1-16, reprinted in Hartwell, R.M., ed., *The causes of the industrial revolution in England* (1967), pp. 97-120.
Wrigley, E.A.,, *An introduction to English historical demography* (1966).
Wrigley, E.A., and Schofield, R.S., *The population history of England 1541-1871* (1981).
Y., B., *A sure guide to merchants, Custom House officers &c, or the modern practice of the Court of Exchequer; in prosecutions relating to His Majesty's revenue of the Customs* (1730).
Y., B., *The modern practice of the Court of Exchequer in prosecutions relating to His Majesty's revenue of the Customs... to which is prefixed, an account of the settlements fo the extents and limits of the several ports of England and Wales* (1731)
Zupko, R.E., *A dictionary of English weights and measures* (1968).
Zupko, R.E., *British weights and measures: a history from antiquity to the late seventeenth century* (Madison, Wisconsin, 1977).